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MEDICAL PRINCIPLES.

BEING A CONCISE SYLLABUS OF

ETIOLOGY; SEMEIOLOGY; GENERAL PATHOLOGY, NOSOLOGY AND GENERAL THERAPEUTICS.

WITH A GLOSSARY.

For the Use of Students.

BY HENRY HARTSHORNE, A.M., M.D.,

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PREFACE.

THE title of this volume is descriptive of its nature and purpose.

Its contents are, literally, *memoranda* of the most important points of the fundamental and introductory portion of the course of lectures delivered by the author in the department of the Theory and Practice of Medicine. It has been prepared under the conviction that, notwithstanding the excellence of the works in use upon the *different subjects* connected with Pathology and Practice, and the existence of several upon the Principles of Medicine, yet no one text-book presents such a view of *all* the topics appropriate to this part of the course, as to form a brief, lucid, and *available* manual of *Medical Principles*.

Not having the leisure, if even conscious of the ability, to mature a work of such pretensions, this little volume is offered as an *outline*, or *partial substitute* for it. It aspires, therefore, only to a position *intermediate* between the professor's skeleton synopsis or syllabus, and the elaborate treatise or text-book. The opinion may, however, be candidly expressed, that there is a need rather for *small* than for *large* books, for the student's use during the over-busy period of his *attendance upon lectures*. The *desideratum* for such works, irrespective of their size, is, that

they should be perspicuous, and should embrace the most important points, relating to their subjects, correctly stated, without redundance. At the same time, the author is aware that the present volume exhibits many imperfections in these respects.

In such an outline, it may be, perhaps, superfluous to abjure all claim to originality, except in *arrangement*, and in an occasional rain of reasoning or observation. I believe it to be the duty of the teacher to collate, from whatever sources, *all that can be made useful to his class;* while a constant reference to authorities would tend only to confuse the student's memory.

It may be mentioned, however, that I have been *chiefly* indebted, on the subject of *Semeiology*, to Barclay's Treatise on Medical Diagnosis, Walshe's on Diseases of the Lungs, Stokes' on the Heart and Aorta, Bennett's and Tanner's Clinical Medicine; and on *General Pathology*, to Simon's Lectures on General, and Paget's on Surgical Pathology, and Rokitansky's Pathological Anatomy. The section on the "Inspection of the Dead Body" was prepared by my friend Dr. T. A. Demmé, of this city.

There is, I trust, in the volume, enough of *individuality* to redeem it from the charge of being a *mere* compilation. Should it be found to answer, in any degree, the purpose for which it is designed, it may hereafter be rendered more useful, by the addition of parallel "memoranda" upon the subjects of *Nosography*, *Special Pathology*, and *Practice of Medicine.*

H. H.

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ERRATA.—On p. 127, 1st line from the top, *omit* the word *phlegmasiæ*. In line 2d, of same page, instead of "inflammations," read "diseases."

SUBJECTS.

1. **ETIOLOGY** (*αιτιον*): the study of the **causation** of disease.
2. **SEMEIOLOGY** (*σεμειον*): of the **signs** and **symptoms** of disease.
3. **GENERAL PATHOLOGY** (*παθος*): of the **seat** and **nature** of disease.
4. **NOSOLOGY** (*νοσος*): of the **classification** of diseases.
5. **GENERAL THERAPEUTICS** (*θεραπευω*): of the **principles** of **treatment** of disease.

MEMORANDA MEDICA.

PART I.

ETIOLOGY.

DISEASE may be *defined as a perversion* either of the *functions* or of the *structure* of the body or of any of its parts.

It is, in other words, a deviation from the normal physiological state or action of the organism, under the disturbing influence of *morbid causes.*

Dr. Williams's classification* of the causes of disease is full, but not consistent or convenient.

The older subdivision into **Percepta, Ingesta, Gesta, Excreta, Applicata,** and **Circumfusa,** is more philosophical, but scarcely complete.

The following classification is proposed by the author:—

CAUSES OF DISEASE.

Hereditary: *e.g.* in tuberculosis; gout; epilepsy; insanity; cancer.

---

* *Principles of Medicine*, pp. 37–53.

Dynamic, or functional (by excess or defect of action): *e.g.* over-exertion; over-excitement; emotion; loss of rest; indolence; sensual excess.

Mechanical: *e.g.* wounds and injuries; tight-lacing; position.

Obstructive: *e.g.* uncleanliness; ill ventilation; neglect of the bowels.

Conditional: *e.g.* extremes of heat or cold; partial exposures or sudden vicissitudes of temperature; moisture or dryness; electrical disturbances.

Ingestive: *e.g.* poisoning; improper diet; intemperance; abuse of medicine; starvation.

Contactive: *e.g.* syphilis; gonorrhœa; itch; hydrophobia; small-pox, etc.

Atmospheric: *e.g.* miasmatic fevers; cholera; yellow fever; erysipelas, etc.

It must be remembered that *very often more than one* cause is engaged in the production of an attack of disease. All such subdivisions exist, therefore, rather mentally than actually. But this does not destroy their usefulness.

Hereditary diseases are not generally *congenital;* it being a *tendency* that is transmitted: a special modification of the organic law or germ-force of the economy. The same period of life is generally observed in the manifestation of this tendency in actual disease.

Some members of a family frequently escape: sometimes a whole generation; the taint again appearing in the next.

Modification of the hereditary tendency may occur; as when the children of an insane person die of meningitis or convulsions; or those of a gouty patient suffer with neuralgia or dyspepsia, etc.

Degenerating *influences affecting the* **race.** (MOREL.)

1. **Toxæmia**: from alcohol, opium, haschisch, tobacco; diseased food, as ergoted rye, bad indian-meal, etc.; deficiency of food; lead, mercury, arsenic, phosphorus.

2. **Malaria** and **pestilences.**

3. The "**great town system**;" including private vice (syphilis) and neglect of public hygiene.

Dynamic or functional causes are illustrated by extreme fatigue, *general or local;* sensual excess; indolence.

Mechanical causes: surgical injuries; tight-lacing; position, in certain employments.

Obstructive causes are of great importance. *Typhus* is especially originated by them; and they aid in developing, propagating, and making more malignant *all zymotic* diseases: *e.g.* yellow fever, cholera, puerperal fever, erysipelas, scarlatina, diphtheria, etc.

Conditional causes: *e.g.* excess of *heat* predisposes to diseases of the liver, stomach, and bowels; cold and dampness, to those of the thoracic organs. (*Coup-de-soleil,* and exhaustion from extreme heat.)

Vicissitudes are more often destructive than *extremes.* Electricity. Ozone.

Hygrometric state of the air, very important.

Ingestive causes: poisoning; errors of diet;—

1. As to *quantity.*

Excess causes indigestion or plethora.

Deficiency, anæmia and debility; perhaps scrofula

2. As to *quality.*

Indigestible food may cause cholera morbus, dysentery, diarrhœa, dyspepsia; *putrid* food, septic poisoning.

Deficiency of *fresh vegetable food* causes *scurvy.*

Deficiency of *oleaginous* material, *tuberculosis.*

Excess of animal food, with *insufficient exercise, gout.*

Deficiency of *animal* food, with cold and wet, *rheumatism.*

Modifying influences of sex, temperament, and age.

The *diseases of women* constitute a separate department.

As a general statement, the female **sex** is characterized, physically, as compared with the male, by greater impressibility and mobility, and less endurance and resistance.

The **temperaments,** as commonly described, are the *lymphatic,* the *sanguine,* the *nervous,* and the *bilious.* Each of these terms is descriptive,* except the last. I propose that, instead of *bilious,* it be called the *sarcous* temperament. It possesses the greatest endurance, combined with greater activity and energy than the lymphatic, less arterial excitability than the sanguine, and less irritability and impressibility than the nervous temperament.

Influence of **age** on disease.—In **infancy** the functions connected with *nutrition* are the most active.

---

* The term bilious may have some meaning as applied to a *morbid* habit of body; but this does not render it applicable to a *temperament;* which is commonly understood to mean such variation of constitution as is compatible with *health.*

The *capillary* portion of the vascular system is most mature.

The *ganglionic* apparatus is predominant in the nervous system.

The *tegumentary* surface is delicate and impressible.

The *heat making* processes are less potent than during adolescence and maturity.

Some organs, as the lungs, etc., are not anatomically developed to their final state.

The period of *dentition* is especially marked by reflex excitability.

During **childhood,** many of the same characteristics remain. Activity of the *glandular* apparatus is also conspicuous; and the *spinal axis* begins to assume, in the nervous system, a greater relative importance.

Fibrin abounds in the exudations resulting from injury or inflammation during childhood.

The diseases most frequent during **infancy** and **childhood** are—

Cutaneous eruptions;
Disorders of digestion;
Convulsions;
Glandular derangements;
Pseudo-membranous inflammations;
(Lobular pneumonia; epistaxis.)

The exanthemata, hooping-cough, and mumps are *not peculiar* to childhood; although comparatively few persons pass through adolescence without having had most of them.

During **adolescence,** the *arterial* circulation attains its height of force and fullness.

The *voluntary motor* energies are especially developed.

The *emotional* impulses are most powerful.

In the female, *menstruation* assumes great importance.

The most frequent disorders of **youth** and **early maturity** are—

Active congestions;
Inflammations;
Hemorrhages.

Tuberculosis, which, during *childhood*, most frequently affects the glands, in *adolescence* selects much more often the *lungs*.

The period of **middle life** should present the most normal balance of development and function, with no special liability to disease. But such morbid tendencies as either *inheritance* or *habit* may have produced are apt now to display their effects. Thus gout, lithiasis, dyspepsia, etc., arise.

As **old age** approaches, the venous circulation becomes more sluggish.

The aggregate vital energy of the system is diminished.

Atrophy and degeneration advance.

The aged are especially subject to—

Passive congestions;
Dropsies;
Catarrhal affections;
Urinary diseases;
Apoplexy;
Morbid adiposity;
Fatty and other degenerations of the heart, brain, liver, etc.

I propose to conclude these remarks upon the causation of disease, by some brief consideration of what may be called the **special etiology** of certain diseases; as miasmatic fevers, yellow fever, typhus, typhoid fever, cholera, cholera infantum, plague, puerperal fever, erysipelas, and diphtheria.

All of these might without impropriety be included under the head of **atmospheric** causation; as, being all of them either *endemic* or *epidemic*, we can scarcely avoid the supposition that, whatever the *nature* of the cause, *the atmosphere is the medium* of its *transmission*. Yet, with the exception of typhus, we can hardly be said to have any *demonstrable* knowledge of the cause of either of these formidable diseases. But we must not undervalue the significance of such facts as we do possess; one or two links, only, being wanting in the chain of evidence regarding each, in order to form a reasonable theory.

No subject can be more interesting to the medical man in this country than the history of our own endemic fevers, of which the **autumnal** (and vernal) **intermittent** and **remittent** are by far the most prevalent.

The principal well-ascertained facts bearing on the *origin* of these fevers are as follows (see *Drake on Diseases of North America*, vol. i.):

1. Autumnal fevers are always **localized** in their prevalence; having certain bounds, even when considered epidemic.

2. They **never** prevail in the *thickly-built* portions of **cities.**

3. A mean summer temperature of at least 60° is neces-

sary to their development; a continuance of **decided warmth** for more than two months being required.

4. They occur with greatest violence in **tropical** or **sub-tropical** climates. Yet some regions, in which the summers are both hot and long, are exempt.

5. They prevail *least* where the surface of the earth is *rocky*, and *most* where the soil is loaded with **organic matter.**

6. The existence of **surface-water** favors their development. They haunt chiefly the borders of marshes, shallow lakes, and slow streams; but not exclusively.

7. Those dwelling upon the **shores** of large lakes are more subject to them than those who navigate their central waters.

8. The vicinity of the **sea** is comparatively **free** from their invasion, unless inland *marshes* lie near it.

9. In the midst of unbroken forests they are rare, but are apt to follow the **clearing away** of woodlands.

10. Heat and moisture may exist together in abundance (as on the Gulf of Mexico) **without**—*other* conditions being absent—producing these fevers.

11. Organic matter has been detected in the air of miasmatic districts.

12. No peculiar gases or other chemical agents, not found elsewhere, have been isolated or recognized in such regions.

13. No electrical peculiarities have been proved to exist in miasmatic localities.

14. The draining of dams or ponds, or other exposure of surfaces, previously covered by water, to the sun, has

repeatedly been followed by fever. The first cultivation of a new soil has been attended in the same way; but continued culture is accompanied by a diminution of the endemic.

15. A period of **incubation**, often extending to from one to three weeks, is common after exposure to the circumstances of a miasmatic district. Persons *exposed in the autumn*, and removing, have sometimes been attacked *the following spring*. The cause has, therefore, a power of **latency** in the system.

16. Some seasons are healthy, and others unhealthy, in the same place, without any *known* difference in its physical conditions or circumstances.

The **hypotheses** which have been started upon these facts are chiefly as follows:—

1. The **electrical** hypothesis. (Sir J. Murray.)

2. The **meteoric** hypothesis; which considers changes of atmospheric *temperature* and *moisture* sufficient to produce these disorders. (*Ozone*, Gaillard.)

3. The **malarial** hypothesis; which supposes the existence of a peculiar gas, generated under certain circumstances, the effect of which upon the body is poisonous.

4. The **vegeto-animalcular** hypothesis; which imagines the existence of microscopic organized growths, which enter the system and produce these peculiar morbid results.

The **electrical** speculations of Murray, Craig, Littell, and others are interesting, as calling attention to a class of facts which have been too much neglected. But they afford no basis for a theory of the etiology of autumnal fevers.

The **meteoric** hypothesis is **excluded** by the following considerations:—

1. The exemption of some situations noted for both heat and moisture of the air; as at Key West, Pensacola, Balize, etc.

2. The prevalence of remittent and intermittent fevers in places but a short distance from the above, or situated precisely like them with respect to heat and moisture; as at the head of Pensacola Bay, etc.

3. The occurrence of these fevers in a few places where the air is comparatively dry.

4. The comparative immunity of *in-door* operatives, in some *large manufactories*, in an air constantly saturated with heated vapor, and in miasmatic districts.

5. The frequent *remoteness* of the *attack* from the *time of exposure;* unlike all other effects of merely *conditional* or physical causes.

Driven thus, by exclusion, to the view that **a material poison,** malarial or vegeto-animalcular (*i.e.* inorganic or organic), is the *causa causans* of remittent, intermittent, and pernicious fever (*all one disease, except in grade*), strong reasons urge the further preference of the **organic** phase of this theory.

1. The law of the *diffusion of gases* interferes much *less* with *this* than with the hypothesis of *inorganic* malaria.

2. Heat and moisture, so favorable to autumnal fevers, also develope the greatest abundance and luxuriance of *animal and vegetable* life. Tropical regions, too, furnish by far the most numerous species of plants and animals having *active* and *destructive properties.*

3. The *non-discovery* of microscopic germs or organisms peculiar to the air of miasmatic regions does not *prove*

their *non-existence.* It only leaves us without the power of *demonstrating* the theory.

4. The *inequality* of *different* seasons, as to the presence or absence of endemic fevers, suggests a parallelism to the unequal abundance of reproduction among animal and vegetable organisms.

5. The fact that *cold,* a *hard frost, always arrests* the prevalence of autumnal fevers (unless in persons already affected by exposure), is significant of the probably organic nature of their cause.

6. The *latency* of the infection, for weeks, or even months after exposure, is at least as well (if not better) explained upon this hypothesis as upon any other.

The *limited, endemic* character of these diseases, moreover (unlike that of cholera for instance), enables us to form the still more definite conjecture, that the special cause of miasmatic or "country fever," the autumnal fever of this country (bilious, remittent, intermittent, congestive, etc.), is a *microphyte; i.e.* a minute vegetable organism, inhabiting certain localities only.

The etiology of **yellow fever** has been, and yet is, the subject of voluminous and zealous controversy. It has narrowed down so much, however, that it will not, in view of the necessity of brevity in this work, be too great an exercise of dogmatism to pass over the *argument* entirely, and state only the *conclusions* arrived at by the author, in common with a majority of those who have devoted much attention to the facts. (See *La Roche on Yellow Fever.*)

Referring the reader to the method of reasoning followed in connection with the subject of *miasmatic* fevers, and

premising that yellow fever is to be considered as entirely a *distinct disease* from remittent fever, the important theoretical conclusions (of the truth of which I am very well satisfied) are these:—

1. The cause of yellow fever is a **specific material,** *probably* a microscopic organism, the difficult transportation of which over long distances makes it also probable that it is *vegetative:* a *microphyte.*

2. This morbid cause or **poison** may, upon this theory, be assumed to be propagated by or through extremely minute but numerous *germs;* which germs (like all others) have certain **peculiar conditions** of vitality.

3. They are seldom developed north of 48° north latitude, or south of the equator. Their "*habitat*" is the shores and islands of the **Atlantic Ocean** and its connected seas, the Gulf of Mexico, and the Western Mediterranean. This **exclusiveness** is remarkable; as it is a *fatal* argument against the theory of its *contagious* transmission. Thus, yellow fever **never** *visits*

The Pacific Coast of America; Bombay;
Canton; Alexandria;
Calcutta; Constantinople;
Athens; nor any of the *interior* cities of either continent.

On the other hand, it visits **often**

The Western Coast of Africa; Vera Cruz;
Tropical islands of the Atlantic; New Orleans;
North Coast of South America; Mobile;
West India Islands; Savannah;
Charleston; and **occasionally,** also,
Rio Janeiro; Gibraltar;

Natchez;	Marseilles;
Vicksburg;	Barcelona;
Memphis;	Cadiz;
Norfolk;	Malaga;
Richmond;	Seville;
Baltimore;	Xeres;
Philadelphia;	Carthagena;
New York;	Leghorn;
Boston;	Sicily, etc.

All of these places are either on the Atlantic, or the Gulf of Mexico, or the western part of the Mediterranean Sea, or on great rivers emptying into one or other part of those waters; all being portions of that great oceanic current which sweeps from the western shore of Africa, freighted with tropical life and death, against the midlands of our western continent; to return, as the Gulf Stream, back upon the European, and finally upon the African Coast.

4. The germs of the yellow fever poison can live and multiply only during *continuous* **warm weather** (average of 80° Fahr. for a month), with a **high dew point**; *i.e.* an excess of moisture in the atmosphere.

5. They require, also, for their development, abundant products of **vegetative** and animal **decay**, especially the former. As we have seen, yellow fever is a disease, not of the country, nor of inland towns, but of **sea-ports**, or cities on great rivers near the sea.

6. The infection* of yellow fever is rarely diffused over regions of great extent; mostly its limits may be measured by **fractions** of a **square mile**.

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* By *infection* I mean atmospheric propagation or transmission.

7. It is *never produced or multiplied in the bodies of the sick; i.e.* is **never,** correctly speaking, **contagious.**

8. It is very **seldom, if ever,** transported by *fomites; i.e.* clothing, bedding, merchandise, etc. If it exist in any such material, it is certainly **destructible,** or removable by simple cleansing and disinfecting measures.

9. **Ships** sometimes transport it *by carrying in their foul and pent-up holds* **materials** *and an atmosphere which afford the necessary* **conditions** for its growth and persistence.

10. But when thus carried, no *extension* or further local propagation of the morbid cause occurs, **unless** *heat, moisture, and emanations of decay abound at the place* to which it is brought.

11. Thorough **cleansing** *and* **fumigation** *of ships,* like that of persons and fomites, will certainly always deprive them of the power to transport or generate yellow fever.

12. The **removal** *of the population* of any infected district will inevitably **arrest** and put an end to any yellow fever endemic.

The mode of causation of **typhus fever** appears to be placed beyond a doubt. It is not confined to any part of the world, although cold climates are especially subject to it; nor to any season, although it occurs most frequently in the winter.

Jail fever, camp fever, ship fever, etc., as *synonyms* for typhus, indicative of its origin in certain instances, all suggest its dependence, *in the first place,* upon one essential cause—**ochlesis** or *crowd-poison* (from οχλος, a crowd).

Wherever the *excreta of human beings,* from their lungs

and skins, as well as bowels and kidneys, *accumulate* in an unrenewed atmosphere, for a considerable period, *typhus will be produced.*

Then it becomes infectious; in fact, contagious. Not only do certain places become tainted with it, so that all persons abiding there are liable to it, but *a single patient* with typhus, taken to a new neighborhood, may generate the disease in other persons. The excretory zymotic agent, which ordinarily requires *numerous* bodies to afford it in typhus-breeding quantity, is so *concentrated* and *dynamized* in the body of the patient sick with the fever, as to have in it the poisoning power of a whole crowd. Thus, in the case of typhus, infection and contagion are mutually convertible; the morbid poison being originated by the alteration and accumulation of matters *naturally produced in the body.* It is not so with the contagion of small-pox, the origin of which is not thus controllable by circumstances, in the absence of its *specific cause;* nor is it so with the *localized* infection of yellow fever, or the *migratory* poison-cause of cholera.

Typhoid fever presents, as to its etiology, much greater obscurity.

It cannot be said that *anything* is *known* in regard to the nature of its causation; it is a subject quite open to, and important for, investigation.

The following are the most striking facts bearing upon it:

1. Typhoid fever is **rare** in persons **over forty** years of age, or under ten.

2. It **scarcely ever** (apart from *relapses*) occurs **twice** *in the same person.*

3. Agencies causing **depression** *of the nervous system*, such as anxiety, fatigue, home-sickness, etc., promote the occurrence of typhoid fever.

4. Typhoid fever is not unfrequently **epidemic** or endemic.

Examples are reported in which typhoid fever has *appeared* to be extended by contagion. Without being able to deny or disprove the possibility of such an occurrence, it appears to me more *probable* that, in the instances alluded to, *typhus* fever has been confounded with typhoid, or a *blending of the two diseases* has taken place.

The subject of the *blending and conversion of the types of fever* (Dickson) appears to me to belong most appropriately to the department of nosography and pathology.

Cholera is an occasional *epidemic* in all parts of the world except Hindostan, where it is *endemic*.

Unlike yellow fever, in which *one attack generally* gives *exemption* for a lifetime, the same person may, if exposed, have any number of attacks of cholera.

Unlike intermittent and remittent fevers, to the local conditions productive of which some races of men (as the negroes) become *acclimatized*, so as not to be susceptible of miasmatic influence,—in the case of cholera, *natives* are, where it prevails endemically, *as liable to* be attacked as foreigners.

Attention to all the facts connected with the origination and migration of cholera has convinced me* that its pecu-

* See a paper "On Animal Decomposition as the Chief Promotive Cause of Cholera," *Philadelphia Medical Examiner*, August, 1855.

liarity, in etiology, is the dependence of its specific cause, for development and propagation, upon **animal matter** in a state of **decomposition.**

Without having space, compatibly with the plan of this work, to *discuss* the reasons which urge this opinion upon my mind, I may give an idea of their nature, under the following heads :—

1. The *Delta of the Ganges,* which is the **endemic** home of cholera, and from which it emanates in periodical migrations from east to west (occupying about six years each time in traversing the world), is remarkable for the amount of *animal decomposition* it presents under the influence of a tropical sun. This evidently results : *a,* from the extensive yearly *inundations* of the Ganges, and the subsidence of the same in the hot season ; *b,* from the common custom of *non-interment of the dead,* who are thrown in vast numbers into the Ganges, as a sacred river ; *c,* from the enormous destruction of life by the various fanatical practices of the Hindoos ; *d,* from their unhealthy habits as regards drinking water, etc., such as are prevalent in all barbarous countries, but whose morbid influence is felt chiefly in tropical climates.

2. An *immense number* of facts have been collected by Dr. Baly, in his Report to the Royal College of Physicians in 1854, showing the importance of "**human intercourse**" in extending the prevalence of cholera.

3. Yet human intercourse does **not** propagate cholera by **contagion,** because contagion has been proved experimentally (as well as incidentally) not to exist : as in the careful trials made personally by Schmidt, Meyer, Marshall, Lizars, Coste, and the surgeons and students at Moscow

and Dantzic, in 1832; and on dogs, by Dr. Lauer Lindsay, in 1854.*

4. It is clear, too, that human intercourse is **not** the **only** mode by which cholera is transmitted. Thus, I have had personal cognizance of two instances—and report has been published of many others—in which it broke out on *ships two weeks out at sea*, there having been no cholera at the ports which the ships sailed from. *The epidemic cause was here*, undoubtedly, **crossing the ocean** *as a cloud*, independently of all other agencies. In one of these instances (the ship Tuscarora), the disease was cut short by the sudden lowering of the temperature of the air at the approach of an iceberg.

5. All testimony agrees that the malignancy and extent of prevalence of cholera are intensified, most of all, by the **filth of towns.** Its mortality has been greatest in Moscow, Paris, Marseilles, Liverpool, Manchester, Edinburgh, New York, etc.; and greatest of all, in the *filthiest parts* of these and other towns.

6. Mere **situation,** as to lowness and dampness, does **not,** to any great extent, affect the liability of a place to cholera. This has been fully demonstrated by Dr. Baly in England, by Orton and Jameson in India, and by Frettenbacher in Russia.

7. **Drinking-water** is a frequent vehicle for the conveyance and maintenance of the cholera cause. Bad water always increases the mortality from it in a striking manner. In London, those districts whose inhabitants used water

* I am aware that Dr. Lindsay *considered* his experiments to support the theory of contagion; but their obvious meaning is otherwise. See *Edin. Med. and Surg. Journal*, April and October, 1854.

from the Thames *below* where the sewers entered it, suffered a mortality (Baly) about *five times as great* as those whose supply was from the river *above* the entrance of the sewerage. Bethlehem Hospital, with four hundred lunatics, having an *artesian well*, was the *only* lunatic hospital in London in which there was *no* cholera in 1849.

8. Yet the reasons already alluded to, proving that cholera is **not dependent** on human intercourse for its extension, also refute the hypothesis of Dr. Snow,* that it is *only* through drinking water, food, etc., that the cholera cause propagates itself.

9. The epidemic at Columbia, Pennsylvania, in 1854, to which the author was a visitant, afforded a remarkable confirmation of the view that animal decomposition, of any kind, is promotive of cholera. The town of Columbia is not large, nor crowded, nor very dirty. There had been no cholera there any previous year. But in the summer and fall of 1854, the Susquehanna, on which it is situated, was *unprecedentedly low;* and large quantities of animal matter (dead cattle, etc., thrown from the railroad trains) putrefied rankly in the sun. When the epidemic commenced, *the wind blew from the river upon the town; and many of the inhabitants also drank the water* of the tainted river.

My conclusion, then, from these and other facts, is this:—

That the difference in origin between typhus and cholera is, that while **typhus** may **always** be produced by unfavorable sanitary conditions, the essence of which consists in accumulation of animal matter in a state of post-organic change,—**cholera** is generated only under the agency of an

* Oration on Continuous Molecular Changes, p. 18.

unknown specific cause; the capriciousness of which, in its migrations, its partial subjection to temperature, and other habitudes, suggest the applicability to it of the **animalcular** hypothesis.*

In connection with this conclusion, I may lay down the following proposition, as of high *practical importance*, toward the *conservation* of the *health* of *communities*: viz., that—

All **malignant** *epidemics are* **preventable**, *and should be prevented*, by attention to those laws of public and domestic hygiene, now becoming systematized in the form of sanitary preventive measures and police. In the protection of localities from yellow fever, for instance, I believe that *the only available and desirable quarantine* is a **dirt**-quarantine. Annihilate or exclude *dirt*, *i.e.* putrefiable animal and vegetable detritus, and *no migratory* or *malignant* morbific poison can sustain its existence, even if its cause be imported to the spot.

It is interesting to know that this view can be shown to be correct, even as regards *plague*, which was once looked upon as the very *type* of contagion.

Plague has now almost died out in those cities of the East to which it was formerly a frequent visitant, if not an endemic. Long ago it was finally excluded from all the ports of Western Europe; *not* by quarantine, which has

* In answer to the objection of Mr. J. Simon to this hypothesis, that *parasites only produce local*, and *never malignant* disorder, I would suggest that it is probably *not as living parasites*, but as *poisonous organic matter* (animal poison), that the microzoöic cause of cholera acts; an apt illustration of this mode of poisoning being seen in the toxic effects of cantharides, putrid meat, etc.

always failed of its purpose, but by improved **sanitary arrangements.**

Further than this, *Cairo* affords an illustration of the *dependence of plague upon* **local** *conditions of* **malaria.** This great oriental capital, before the time of Mohammed Ali Pasha, many times lost tens of thousands of its inhabitants by visitations of plague. That wise viceroy, by costly drainage, transformed an immense swamp, in the heart of the city, and the receptacle of all its filth, into a park or square (the Esbekieh); and now *Cairo is free from plague.*

Cholera infantum is a disease whose causation has, undoubtedly, three elements:—

1. Intense summer **heat.**
2. The **atmosphere** of *large* **cities.**
3. The *peculiar* **susceptibility** of *infants.*

Of these, the second is the most under control, by removal to the pure air of the open country.

Country air, then, is *the prophylactic* (preventive), and also one of the principal *remedies* for this severe and often fatal complaint of infancy.

Erysipelas is frequently *endemic*, especially in *large surgical hospitals.* As to its causation, a *minority* of cases only occur **idiopathically**; *i.e.* without any local wound, injury, abscess, etc., to originate cutaneous inflammation. Most cases are **traumatic**; *i.e.* connected with injuries of the surface of some kind. Yet very many wounds, abscesses, surgical operations, etc., may occur without any erysipelas.

There appears, then, to be for its production required—

1. A peculiarity of the **atmosphere.**
2. A morbid tendency of the patient's **system.**
3. Mostly, but *not always*, a **lesion** *of the skin.*

The *accumulation of the effete organic material thrown off in connection with inflammation* seems to be the source of that contamination of the air which predisposes to erysipelas. And probably the accumulation in the *blood* of the *same material* constitutes the cause of *individual* proclivity to it; while the presence of the very process of inflammation upon the surface is its most usual *exciting* cause.

Analogy, or, more correctly, *affinity*, of a very close and important kind, exists between *erysipelas* and *puerperal fever.** Both of these diseases occur very often at the *same time* and the *same place.* Similar circumstances—those of the crowding together of human beings, the bodies of some of whom are in a state of disease—will produce *erysipelas* in persons of either sex who have suffered some lesion of the surface, or *puerperal fever* in parturient women.

This etiological association of these two diseases is sustained by their *pathological* analogy or relationship. The *traumatic* state of the *uterus* after childbirth, in which blood, mucus, etc., may collect and become decomposed, is parallel to the condition of injury or inflammation which is the usual exciting cause of erysipelas upon the skin. The further pathological resemblance of these affections may be expressed thus:—

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* Distinguishing, of course, between this, as an *epidemic* or *endemic* disease, and *sporadic* puerperal *peritonitis.*

Erysipelas is an acute febrile disease, in which a peculiar diffusive inflammation is a prominent characteristic; the seat of this inflammation being the *skin, areolar tissue*, etc.

Puerperal fever is an acute febrile disease, in which a peculiar diffusive inflammation is a prominent characteristic; the seat of this inflammation being the *uterine veins, peritoneum*, etc.

Lastly, many cases have occurred, in which there was reason to believe that an obstetrician, going from the chamber of a patient with erysipelas to that of a lying-in woman, has been the means of production of puerperal fever in the latter. The most thorough disinfecting means, with change of clothing, etc., ought certainly to be resorted to, if, in knowledge of this fact, the practitioner ventures to interchange his visits between patients under such circumstances.

The theory of "**continuous molecular changes**" appears to apply to the infection of puerperal fever and erysipelas; but to expatiate upon this would occupy us too long a time.

Diphtheria is a name recently given to a disease which, although described by some ancient writers, and occurring at intervals in different countries of Europe for many centuries, has nevertheless increased in the frequency and extent of its epidemic visitations within a few years. It is characterized by fever and debility, with pseudo-membranous inflammation of the fauces, tonsils, and pharynx, extending in some cases into the larynx.

The etiology of diphtheria remains, as yet, in great obscurity. The leading facts are, that it is usually epidemic,

and that its visitations are remarkably limited; "acting with intensity in *confined centres;* as a small village, a crowded school, a numerous family;" a sort of *domestic pestilence.*

Like other zymotic diseases, it attacks with greatest malignancy those places in which public and private hygiene are most neglected. The poor are therefore the greatest sufferers. But it is not confined to their dwellings. The effeminating influences of luxury and indolence invite it also to the homes of the affluent, where debility of constitution appears to aid or supply the place of a foul atmosphere as a predisposing cause.

Diphtheria has prevailed under very various circumstances of situation, soil, climate, and season. "The only cosmic influences which appear to exhibit any promotive agency in its development are excessive *alternations* of temperature, and of the barometric state of the atmosphere."

In the combination of a peculiar and diffusive inflammatory affection of an epithelial (mucous) surface with a constitutional febrile affection, diphtheria presents some analogy, deserving of attention, to erysipelas. It is probable that the infection of the two diseases will be found to have a similar rationale, and to be subject to the same laws of development and prevention.

Contagion has been urged by Guersent, Bretonneau, Trousseau, and others, as explaining the mode of transmission of diphtheria. But the experiments of Trousseau himself, and those of Harley, failed entirely to verify this view; and the apparently self-determining manner of *migration* of the disease (*e.g.* in England from the southeast to the

northwest in 1857–9) presents difficulties in the way of this theory of personal transmission, analogous to those connected with the history of cholera. So that even those who insist most strongly upon its contagiousness are obliged to admit, that the movements and invasions of diphtheria are **by no means dependent** upon such a mode of conveyance.

PART II.

SEMEIOLOGY.

I. RATIONAL SYMPTOMATOLOGY.

II. PHYSICAL DIAGNOSIS.

Rational symptoms and **physical signs** are distinguished (somewhat arbitrarily) thus: a rational symptom is a sign of disease which is obvious to the patient himself or to the practitioner without close inspection. A physical sign is one determined by examination into the properties and material conditions of the organs of the body; as by palpation, auscultation, percussion, etc. Symptoms guide us, generally, by *physiological inference;* physical signs, by *anatomical necessity.*

Symptoms and physical signs together contribute to **diagnosis**; *i.e.* the knowledge of the character of the morbid process or state in given cases; the answer to the question, "what is the matter?"

Prognosis is the anticipation of the *progress* and *results* or *terminations* of disease.

SECTION I.

SYMPTOMATOLOGY.

Symptoms, or **rational signs**, are—

Local, or constitutional;

Idiopathic (primary), or secondary;

Premonitory (prodromata);

Critical;

Pathognomonic (characteristic).

We examine the symptoms of disease as connected with the digestive, circulatory, respiratory, tegumentary, secretory, motor, sensory, and psychical apparatus.

DIGESTIVE SYSTEM.

The **tongue** may be natural, pale, cold, red, furred, brown, black, cracked, or fissured.

It is *pale*, in anæmia.

Cold, in *collapse*, as of cholera, etc.

Red, in scarlatina, stomatitis, sometimes in gastritis.

Furred, in indigestion, gastro-hepatic catarrh, fever, etc.

Brown or *black*, *cracked* or *fissured*, in low fevers: as typhus or typhoid.

The *manner of cleaning* of the tongue during convalescence should also be noticed, as affording prognostic indications.

The **teeth** are *covered with sordes* in low febrile states.

They are *loosened* by severe salivation.

Their *rapid decay* shows impairment of constitution; but this is unfortunately very common.

The **gums** are swollen, soft, and spongy, and prone to bleed, in scurvy.

A *blue line along the gums* is observed in lead poisoning.

A *red* line along their edge is sometimes noticed in phthisis.

Swelling and soreness of the gums, with tenderness of the teeth, and a coppery taste, occur in *salivation.*

Increased flow of saliva gives name to this effect of mercury on the mouth.

Deficiency and thickness or viscidity of the saliva occurs generally during fever; and often also in chronic diseases, especially of the throat or stomach.

The **taste** is morbidly

Bitter, in hepatic derangements, dyspepsia, etc.;

Sour, in gastric indigestion;

Saltish, in phthisis pulmonalis, hæmoptysis, etc.;

Putrid, in gangrene of the lungs.

Appetite is generally *deficient* (anorexia) in disease, especially of an acute character.

Excessive appetite (bulimia) is not often important; sometimes it occurs in nervous affections, in *diabetes*, and in persons having *tape-worm* in the alimentary canal.

Perverted appetite is one of the symptoms of chlorosis, hysteria, etc.

Thirst is *excessive* in *two very opposite* conditions: *high fever* and *low collapse.*

Difficulty of swallowing (*dysphagia*) may result from—

Inflammation of the fauces, tonsils, or pharynx;

Spasmodic constriction of the throat;

Stricture of the pharynx or *œsophagus;*

Obstruction by a foreign body, tumor, etc.;

General debility, as in the moribund state.

Nausea and vomiting may occur from—

Indigestion: egesta,* partly digested food, mucus, etc.;

Colic: eg., ditto, bile, etc.;

Pregnancy: eg., mucus, food, etc.;

Gastritis: eg., abundant and altered mucus, etc.;

Hysteria: eg., gastric and biliary secretions, more or less altered;

Cholera morbus: eg., gastric and biliary secretions, diluted;

Cholera maligna: eg., copious watery fluid (rice-water);

Ulcer of stomach: eg., mucus, lymph, blood;

Cancer of stomach: eg., ditto, with cancer-cells, fibres, etc.;

Disease of the brain: eg., not peculiar in character.

Bright's disease of kidney: eg., not peculiar;

Strangulated hernia: eg., stercoraceous (fæcal).

Sarcinæ, or microscopic, wool-sack like vegetable parasites, are occasionally found in matters vomited, in cases of disease of the stomach. Epithelial cells, starch granules, torulæ (also vegetable) and vibriones (animalcular) are often discovered by the microscope.

SYMPTOMS CONNECTED WITH THE CIRCULATORY SYSTEM.

Palpitation or disturbed action of the heart may depend upon—

Pericarditis or *endocarditis;*

Hypertrophy of the heart;

* *Egesta*, matters thrown out.

Chronic valvular disease;
Anæmia;
Nervous irritability (nervousness);
Dyspepsia.

The pulse should be examined when the mind and body of the patient are as tranquil as possible. It is most rapid in the standing posture, less so when sitting, slowest in the recumbent position. Dr. Guy asserts it to be most rapid in the morning. It is increased in force and frequency by exercise, food, and emotional excitement. The pulse of the female is slightly more rapid, as a rule, than that of the male sex. It diminishes in rapidity from birth to old age; but in very aged people it again becomes somewhat accelerated.

In obscure cases we should examine the pulsation of other arteries besides those at the wrist; and should especially observe the character of the *impulse of the* **heart.**

In adults, the average number of beats in health is, for the male, 70; for the female, 75.

At birth, 120 to 140.
Infancy, 120 to 100.
Childhood, 100 to 90.
Youth, 90 to 80.
Middle life, 75 to 65.
Old age, 70 to 60.
Decrepit age, 75 to 80.

We judge by the pulse (inferentially) of the force of the **heart's** action, of the force of the **arterial** impulse, of the **excitability** of the nervous system, of the **fullness** of the blood-vessels, and of the tone and physical **condition** of the arteries.

The pulse in disease may be *natural*, or *strong, weak, firm, yielding, full, small, bounding, compressible, rapid, slow, quick, jerking, hard, soft, tense, gaseous, corded, wiry, thready, imperceptible, regular, irregular, intermittent, dicrotous.*

Not considering it necessary here to define each of these terms, it may be remarked that an important difference exists between a *rapid* pulse and a *quick* pulse, and between one that is merely *full* and *large* and one that is *strong.*

The pulse of **fever** is characterized by *moderate* **acceleration,** with variable increase of force in the beat.

The pulse of **inflammation** (with constitutional excitement) is not only *accelerated*, but **hard** or *tense.* Whatever may be said to the contrary, this character of the pulse is, in acute inflammations, of great consequence as an indication of treatment; although, of course, it must not be depended on *alone.*

The pulse of **nervous irritation** is usually **quick,** and **variable** in rapidity and force, under excitement or repose.

The pulse of *extreme* **debility** is nearly always (as in the dying state) very **rapid** and very **small,** or "thready."

Irregularity of the pulse is occasionally congenital; sometimes it comes on with old age. It may be a transient symptom, accidental, as it were, during the progress of an acute malady; or at the commencement of convalescence, as from remittent fever. It is directly related to the nature of the disease, in certain cases of *disease of the heart,* and in *meningitis* (inflammation of the membranes of the brain) during the stage of effusion.

The **dicrotous** or double pulse is observed especially

during *continued fevers*, either typhous or typhoid. It is explained by a loss of muscular tone in the arteries, so that the arterial impulse is separated from that of the ventricles by a perceptible (though slight) interval.

The state of the **capillary and venous circulation** often affords signs of disease. Torpor of the circulation is marked by slowness in the return of the blood after it has been displaced by pressure; for instance, upon the cheek or the back of the hand. The *veins* of the hand or arm may be similarly examined with advantage; as in *cholera, pernicious intermittent, low continued fever*, etc. The venous circulation is affected not unfrequently in *heart-disease: e.g.* pulsation of the jugular veins, from valvular disease involving the right side of the heart; *cyanosis*, or *blueness*, from imperfect separation of the arterial from the venous blood, etc.

Pulsation of the veins does not, however (notwithstanding the dictum of authorities), *always* depend upon disorder of the heart. The author has seen three cases in which jugular pulsation was evidently the result of *local irritation*, exaggerating the muscular activity resident in the organic muscle-fibres of the vein.

The **blood** itself is perhaps the most important of all subjects of inquiry in connection with disease. Little, however, as yet, is known of its morbid changes. The principal facts are, that—

In *anæmia*, there is a deficiency of the red corpuscles;

In *plethora*, an excess of the red corpuscles;

In *leucocythemia*, an excess of the colorless corpuscles;

In *inflammation*, and in *chlorosis*, excess of fibrin;

In *gout*, excess of uric acid;

In *Bright's disease*, excess of urea, etc. (uræmia);

In *diabetes*, excess of sugar;

In *malignant cholera*, deficiency of water, albumen, and salts.

These peculiarities require minute inspection, with the aid of the microscope or of chemical reagents. To the eye, differences sometimes exist which may be instructive: *e.g.* as to the bright red or very dark color of the blood; as to the magnitude, form, and firmness of the clot, and the rapidity of coagulation, etc.

In cases of lingering prostration, clots may form in the heart or large arteries before death. After very rapid malignant diseases, the blood is sometimes found uncoagulable.

Hemorrhage from different parts of the body is often important as a symptom, but requires to be interpreted with care. Its consequence varies much with its *quantity*, and the *source* of the blood thrown out.

Thus, in **epistaxis**, or bleeding at the nose, the flow may result from—

Mechanical injury;
Congestion of the Schneiderian membrane;
Congestion of the brain;
Typhoid fever;
Hemorrhagic diathesis;
Suppressed menstruation.

This variety of hemorrhage is, however, *most* frequent during *childhood* and early adolescence.

In **hæmoptysis**, or spitting of the blood, the source of the hemorrhage may be the—

Gums;
Posterior nares;

Throat (*e.g.* ulcerations, etc.);
Bronchial mucous membrane;
Lungs;
Stomach.

In the *last* case, being *vomited* into the mouth, it is properly called **hæmatemesis.** Sometimes it requires care to determine *what is* the source of blood coming from the mouth. We must notice what are the *symptoms preceding* the hemorrhage; and the *manner of its ejection*, whether by *coughing* or *vomiting*, etc., as well as the appearance of the blood, whether mixed with food, gastric fluid, etc.

True **pulmonary hæmoptysis** may arise from—

Active congestion of the lungs;
Passive congestion, from heart-disease;
Tubercular phthisis;
Hemorrhagic diathesis;
Vicarious monthly flow, in the female;
Mechanical injury, as fractured rib, etc.;
Rupture of aortic aneurism.

Hæmatemesis, or vomiting of blood, may be—

Hysterical;
Ulcerative;
Cancerous;
Vicarious; etc.

Uterine hemorrhage, other than the normal menses, may be—

Congestive;
Ulcerative;
Cancerous; as well as, in the *pregnant* female, *placental*, technically called "unavoidable hemorrhage."

Hemorrhage from the bowels may be connected with—

Hemorrhoids, or piles;
Dysentery;
Ulceration of the bowel;
Cancer of rectum, etc.;
Rupture of aneurism;
Hemorrhagic diathesis;
Vicarious menstruation.

Hæmaturia, or bloody urine, may result from—

Mechanical injury of the bladder, prostate gland, or urethra;
Renal inflammation;
Calculus;
Hemorrhagic diathesis;
Passive senile congestion of the kidneys;
Scarlatina.

SYMPTOMS CONNECTED WITH THE RESPIRATORY ORGANS.

The normal, average rate of breathing in the adult, while at rest, is sixteen or eighteen respirations in the minute. In fever it is much accelerated. In *extreme narcotism* it becomes slower than natural. In some cases of *fatty degeneration of the heart* it is sighing and interrupted.

Dyspnœa, or difficulty of breathing, when great, is called **orthopnœa**, from the erect posture required by the patient. **Cervical respiration** occurs in cases of great exhaustion, or of obstruction of the respiratory function by disease.

Dyspnœa may be caused by—

Chlorine or other irrespirable gases in the air;
Morbid change of the blood, as in cholera;
Laryngeal or *tracheal obstruction*, as in croup, etc.

Bronchial spasmodic constriction, as in asthma;
Bronchitis; pneumonia; pleurisy; phthisis;
Heart disease; aneurism of thoracic aorta;
Cancer within the chest; hydrothorax; ascites.

Coughing may depend upon a variety of causes, the nature of which may often be concluded upon from its character. Thus, usually,

Cough is *dry and hollow*, or *hacking*, when nervous or sympathetic;
Dry and tight, in early bronchitis;
Soft, deep, and loose, in advanced bronchitis;
Hacking, in incipient phthisis pulmonalis;
Deep and distressing, in confirmed consumption;
Short and sharp, in pneumonia;
Barking and hoarse, in early or spasmodic croup;
Whistling, in advanced membranous croup;
Paroxysmal, and whooping, in pertussis.

Expectoration is—

Mucous, in catarrh, and early bronchitis;
Purulent, in severe and protracted bronchitis;
Rusty, in the early and middle stages of pneumonia;
Bloody and muco-purulent, in phthisis;
Nummular and heavy, etc., in advanced phthisis;*
Putrid, in gangrene of the lung.

The **temperature** *of the breath* is *increased* during the *febrile state*. It is *lowered*, sensibly, only in aggravated prostration; as in the collapse of cholera. Coldness of the breath is an almost certain prognostic of dissolution.

The **odor** of the breath is rarely perfectly agreeable ex-

* Microscopic examination has discovered (Schrœder von der Kolk) portions of disintegrated *lung-tissue* in the expectoration of *phthisical* patients.

cept in the healthy infant or child. It is very heavy at the commencement of fever; sour during indigestion; offensive, often, from decayed teeth; rotten, in gangrene of the lung.

Hiccough (singultus) is produced by a spasm of the diaphragm. It may depend upon *indigestion, nervous disorder,* or *exhaustion.* It is serious in prognosis only when the latter is present or is anticipated.

Stertorous *respiration,* from relaxation of the *velum palati,* results from *cerebral oppression;* the cause of which may be *apoplexy, fracture of the skull, dead drunkenness,* or *narcotism* by opium, etc.

SYMPTOMS CONNECTED WITH THE TEGUMENTARY APPARATUS.

The skin is **hot** and **dry** during the presence of **fever.**

Moisture is almost always a *favorable* sign.

The exceptions are, the profuse *colliquative* sweats of phthisis, etc., and the *cold and clammy* perspiration of extreme prostration. Coldness of the skin, or inequality of temperature, is always more or less unfavorable.

Emaciation is often an important sign. It generally occurs in severe chronic diseases, but is sometimes rapidly brought on in acute affections: *e.g.,* diarrhœa or dysentery. The changes which occur in the adipose tissue, and in the plumpness and roundness, or flabbiness and shrunken appearance of the surface of the body, are often *extremely rapid in children.*

The **color** of the skin varies much in disease. Thus, the face is

Pale, in anæmia, syncope, etc.;

Flushed, in fever, congestion of brain, etc.;
Cheeks brightly flushed, in hectic fever;
Forehead and eyes flushed, in early stage of yellow fever;
Purple or livid, in low continued fever;
Yellow, in jaundice, bilious fever, yellow fever;
Sallow, in chlorosis, dyspepsia, cancer;
Blue, in the collapse of cholera, and in cyanosis;
Black, almost, in asphyxia.

Eruptions upon the skin are characteristic of certain diseases. Their description belongs to the departments of Nosology and Special Pathology.

SYMPTOMS CONNECTED WITH THE SECRETIONS.

These must always be considered along with *other* explanatory symptoms; and the **character** of the *discharges* should never be overlooked. Thus,

Constipation may denote—
Torpor of the muscular coat of the bowels;
Deficient *secretion* of the liver, or intestinal glands;
Defective *innervation*, from spinal or encephalic disease;
Stricture of rectum, colon, etc., or *cancer;*
Intussusception, strangulated hernia, etc.;
Sympathetic disturbance from fever, etc.

Diarrhœa and **dysentery** will be considered under another department. It may be mentioned, however, that in *dysentery* the discharges contain blood, mucus, lymph (in small quantity), and, when ulceration has occurred, pus. In *diarrhœa* they are either fæcal, mucous, bilious, or serous—the latter being of importance especially in the diagnosis of *cholera*.

SYMPTOMS CONNECTED WITH URINATION.

Dysuria, or difficult urination (strangury).

Ischuria, retention of urine.

Enuresis, incontinence.

Diuresis (diabetes), excessive discharge of urine.

Morbid character of the urine itself.

The average quantity of urine passed by a healthy adult in twenty-four hours, is from thirty to forty ounces—greatest in the winter.

In reaction to test-paper, the urine is normally *acid;* reddening litmus, or restoring to turmeric its yellow after it had been made brownish red by an alkali.

The *color* of healthy urine is that of *amber.*

The average *specific gravity* of human urine (water being 1000) is 1017–20; containing about twenty grains of solid matter to the ounce.

Deviation, to a certain extent, from any or all of the above standards as to quantity, reaction, color, and weight, is quite compatible with ordinary health; but a very decided and persistent deviation is a proof of disease.

Retention of urine may be caused by—

Spasmodic constriction of the vesico-urethral muscular fibres;

True *stricture of the urethra;*

Enlargement of the prostate gland;

Calculus in the bladder or urethra.

Percussion and palpation, as well as catheterism, are sometimes necessary to determine the fact of retention of urine.

Suppression of urine, from inaction of the kidneys, is a most serious symptom under all circumstances. If long continued, it becomes fatal by *uræmic poisoning*—coma, and often convulsions, preceding death. *Partial* suppression of urine occurs, sometimes transiently, in cholera, scarlet fever, etc.

Excessive urination is frequently present in hysterical cases—the water being pellucid, and of low specific gravity (diabetes insipidus). The influence of cold and of diuretic medicines produces a similar watery excess, with little increase in the solids of the urine.

Diabetes mellitus is, however, a more important affection; in which the urine is not only excessive in quantity, but *heavy*, and *loaded with sugar*.

For the accurate estimation of the changes occurring in the urine in disease, some scientific skill is requisite. To pursue *original investigations* upon the subject, considerable practical knowledge of *analytical chemistry*, and of the use of the *microscope*, is indispensable. But for the *application* of the conclusions of pathological chemists and micrologists to *diagnosis*, a much more moderate amount of skill will suffice. There is wisdom in the remark of Dr. Todd (*Clin. Lect. on Urinary Organs*, etc., p. 73), that, "while it is clearly a duty not to neglect any means of observation and investigation, it is desirable that you should be as little as possible dependent on means which are not always at hand, and which it does not fall to the lot of every eye and hand to use with equal readiness and skill."

I shall state, on this principle, only the *most important* and *available* points in urinary pathology and diagnosis.

Allowance must always be made, or correction obtained,

for the *variation* the urine undergoes in the course of the same day. It is divided technically into the *urina* **sanguinis**, *urina* **chyli**, and *urina* **potus**; the first being that after a night's rest, the second that after dinner, the third after a very light meal with fluid, as tea. All of these should in each case be examined and compared.

The questions in regard to any given specimen of urine are (see *Barclay's Medical Diagnosis*), as to its **general appearance, specific gravity, acidity** or alkalinity, the chemical or microscopical character of its **sediments**, and the **effect of reagents** upon the clear fluid.

General appearance. If *clear*, after standing a few hours, note the *color*. *Deep-colored* transparent urine, of high specific gravity, indicates excessive metamorphosis of tissue. In *jaundice*, the urine is generally very yellow, and sometimes as dark as porter.

If the urine be *opaque*, it is either *white* or *dark*. *White* opaque urine contains either *mucus*, or *pus*, or undissolved *earthy salts*, or all of these together. Mucus floats more distinctly in a separate cloud than pus; purulent urine is generally opaque throughout, and of a creamy yellow color at bottom.

Dark-colored opaque urine is most frequently tinged with *blood*, giving it a pinkish or brownish hue. The latter color prevails especially in cases of passive hemorrhage from the kidney—the former, in fresh hemorrhage from the bladder, or in acute renal hemorrhage. Urine may also be dark from the presence of *bile* (as in jaundice); in that case it will become *green* on the addition of *nitric acid*.

The **specific gravity** of urine is easily ascertained by means of the *urinometer*.

Excessive weight of the urine is caused by its containing an unusual quantity of *salts*, or of *urea*, or by *sugar*. The quantity passed in twenty-four hours must always be considered in connection with its specific gravity, so as to judge of the actual quantity of solids passed, as well as their degree of dilution.

The *heaviest* urine is that of *diabetes* mellitus (glycosuria); sometimes reaching 1060. The *lightest* is observed in hysteria, and in Bright's disease; running down sometimes to 1005 or lower.

The *degree of* acidity of urine may be *approximately* estimated by the more or less decided redness given by it to litmus-paper. If it be alkaline, it will, of course, make turmeric brown, and restore the blue to litmus reddened by an acid.

Alkalinity is *uncommon*. It depends upon either fixed or volatile alkali. If the former, it is commonly associated with *nervous debility* or general depression of vital power; unless accounted for by the medicinal use of some preparation of potassa, soda, or lithia. Excess of the phosphatic salts, and of oxalate of lime (oxaluria), often accompanies alkalinity of the urine. The importance of the presence of oxalate of lime has probably been overrated.

Carbonate of *ammonia*, when present in the urine, causes it to *effervesce* on the addition of an acid, from the escape of carbonic acid gas. The change of color produced by ammonia in turmeric-paper will, also, disappear when it is heated.

Ammoniated urine becomes so by the decomposition of urea, and its conversion into carbonate of ammonia. When the bladder is *inflamed*, and contains *unhealthy mucus*,

this decomposition occurs either in the bladder, or in the urine shortly after it is passed; making it alkaline in reaction, and effervescent when acid is applied. Urine will, in cases of much less frequency, effervesce on the addition of acid, from the presence of *carbonate* of *lime*.

Sediments occur in the urine, either when first passed or after standing, from its containing substances insoluble in the fluid, or precipitated by cold, or from chemical changes rapidly occurring in it. Such sediments may be examined both chemically and microscopically; but it is only in a few instances that the employment of the microscope is indispensable.

A *fawn-colored* deposit, *entirely dissolved by heat*, consists of **urates** of ammonia and soda.

A similarly colored deposit of *cystine* occurs, rarely, *not soluble by heat*.

Heavy red sand, at the bottom of the vessel, insoluble in hydrochloric acid, but *dissolved by nitric acid*, and also by *alkalies* (as liquor potassæ), is **uric** (lithic) *acid*.

Blood corpuscles sometimes fall to the bottom, but they are *not soluble in acids or alkalies*.

A *whitish deposit, not at all dissolved by heat*, but dissolved by nitric acid, consists of **earthy salts**, phosphatic or oxalic. If oxalate of lime, it will *not be dissolved by acetic acid;* if phosphates, that acid will render the liquid clear.

A *creamy white, or yellow, flocculent and ropy deposit, dissolved by liquor potassæ*, consists of **pus**.

The **microscope** may detect, even in urine scarcely opaque,

Blood corpuscles, more or less altered in shape;

Mucus corpuscles, less numerous and smooth than

Pus corpuscles, which are granular, and with several nuclei;

Epithelial cells or scales, from the kidney or bladder;

Tubular casts, from the kidney;

Spermatozoa;

Oxalate of lime, in transparent octohedral or dumb-bell crystals;

Uric acid crystals, lozenge-shaped, or square prisms;

Triple phosphate (of magnesia and ammonia), in three-sided prisms with beveled ends;

Phosphate of lime, granular, or in long needle-shaped crystals.

Urine **free from deposit** should, in suspected cases, be tested for **albumen**, and for **sugar**.

The test for **albumen** is the successive addition to the urine of *heat* and *nitric acid*. If it become *turbid* or coagulated under their influence, it is albuminous. We must remember, however, that *albuminuria* is no longer synonymous with Bright's disease. Albumen occurs, *transiently*, in the urine in many acute affections, as scarlatina, diphtheria, and renal congestion from cold and wet. It is only when its *persistency* is established that it becomes pathognomonic of degeneration of the kidney. In *rare* instances, moreover, this degeneration has been proved (post mortem) to exist, *without albuminuria*.

The principal tests for *diabetic* **sugar** are *liquor potassæ—solution of sulphate of copper followed by liq. potassæ—* and *fermentation*.

Boiled with liq. potass., saccharine urine becomes first yellow, then brown, then *ruby red by transmitted light*.

Trommer's test consists of the addition of a *few drops*

of strong solution of sulphate of copper, followed by a much larger quantity of liquor potassæ. A *yellowish*-brown precipitate is *rapidly* thrown down if sugar be present.

Urine will not ferment with yeast unless it contain sugar, which is not a normal ingredient of the secretion.

The **quantitative** analysis of urine, to determine the proportion of urea, etc., requires considerable chemical proficiency.

It has already been stated that *heavy* and *dark-colored urine* (diabetic urine is straw or amber colored), with a strong odor, may be inferred to contain an excess of post-organic solids, among which **urea** is the most important.

Kyestein is a greasy pellicle found on the surface of urine after a day or two standing, in pregnant females, or in those whose mammary glands are excited by sympathy with uterine irritation.

Chloride of Sodium has been found (Redtenbacher) to *disappear* from the *urine* in *pneumonia*, and (Beale) to appear at the same time in excess in the *sputa*. This may be tested by the addition of a few drops of *nitric acid*, followed by *solution of nitrate of silver*—a white precipitate of chloride of silver indicating the presence of the chloride of sodium.*

The secretion of **milk** may be affected in quality as well as quantity, by the physical or even mental state of the mother.

The *sudden* **arrest** of the formation of milk in the mam-

* Chloride of ammonium will produce the same reaction; but this salt is rare in the urine or sputa.

mæ, with the cessation of the lochial discharge, is a very serious symptom in the *parturient state*, especially during the first few days after child-birth.

The influence of *menstruation and its disorders* upon the health of the female, comes properly under the department of *Diseases of Women.*

Perspiratory changes have already been alluded to, in speaking of the *tegumentary apparatus.* Strong *odor* of the perspiration indicates vicarious excretion by the skin, and commonly accompanies insufficient action of the bowels. *Acidity* of the perspiration is sometimes dependent on the presence of an excess of uric acid; which, in gout, in the form of urate of soda, is occasionally concreted palpably upon the surface of the body.

SYMPTOMS CONNECTED WITH THE MOTOR APPARATUS.

The **decubitus**, or mode of lying down, of a patient, should be noticed. *Inability to rise* may depend upon *general debility, paralysis* of the extremities, rheumatic or gouty *inflammation* of the joints, etc., or *injuries*, such as fractures or dislocations.

Inability to lie down is most frequently the result of dyspnœa (orthopnœa)—the respiratory muscles having the freest scope in the erect position.

In *colic*, the patient generally prefers to lie upon the belly.

In *peritonitis*, the characteristic position is upon the back, with the *knees drawn up*, to relax the abdominal muscles.

Lying *upon one side* is often significant in disease. In the early stage of pleurisy, the patient prefers to lie upon

the *healthy* side; when effusion has taken place, this is reversed. In irritative disorder of the liver, with enlargement, the patient will often lie most comfortably upon the right side. When the heart is enlarged or violent in its action, the sufferer *generally* cannot lie upon the left side. The exceptions are most frequent in cases of long standing.

Muscular debility may be the result of acute disease, as fever, or of actual exhaustion and prostration. *Total want of exercise* will enfeeble the muscles; as, when a limb is long confined in splints on account of a fracture or other injury.

Spasm is of three kinds: *tonic, clonic,* and *choreic.*

Tonic spasm is *fixed rigidity. Clonic* spasm is ordinary *convulsion:* i.e. *successive* contractions of the muscles at short intervals. *Choreic* spasm is a term suggested by the author to indicate the jerking, irregular movement of the muscles, not controllable by the will, in cases of chorea.

Paralysis will be alluded to presently.

SYMPTOMS CONNECTED WITH THE SENSORY APPARATUS.

Of these, the most important is **pain.** Pain may be—

Acute, sharp, cutting, as in pleurisy;
Shooting, darting, as in neuralgia;
Lancinating, in cancer;
Gnawing, tearing, in rheumatism;
Dull, heavy, aching, in pneumonia;
Griping, twisting, in dysentery;
Bearing down, in second stage of labor;
Pulsating, in the formation of an abscess;
Burning, smarting, in erysipelas;

Stinging, nettling, in urticaria;

Constant or *intermittent;* fixed, or wandering.

Tenderness *on pressure* is generally associated with *inflammation;* although some affections designated as neuralgic also present it—possibly from inflammation of the sheaths of the nerves.

Sometimes pain is *relieved* by pressure; as in many cases of *colic* and *dysmenorrhœa.* This is a sign, certainly, of the *absence* of inflammation.

Pain is *not always at the seat of disease.* Thus, in disease of the hip joint (morbus coxarius), the pain is felt chiefly at the knee; in calculus of the bladder, at the glans penis; in ovarian disease, sometimes, along the limbs; in disorder of the liver, often, under the scapula; in dyspepsia, frequently, about the sternum; and in irritation of the uterus, on the top of the head.

Total **loss** of sensation, local or general, is called **anæsthesia. Acinesia** (a term seldom used) is loss of muscular power.

Paralysis of one side only, of the body, *e.g.* the right arm and leg, is *hemiplegia.* Paralysis of both lower extremities, *paraplegia.* These terms are commonly applied either to loss of power, loss of sensibility, or the more usual combination of both.

The **eye** affords many indications of disease. A prominent and turgid condition of both eyes occurs in acute ophthalmia, and in congestion of the brain. If *one eye* alone becomes prominent, local disease, *e.g.* a tumor behind the orbit, may be suspected. The eyes are sunken, in phthisis, and in other wasting maladies. Sinking of *one* eye indicates local atrophic disease.

The **movements** of the eyes should be noticed, especially in children. Rolling of the eyeballs from side to side is a common symptom of nervous restlessness or cerebral irritation in infants. *Squinting*, occurring as a symptom in disease, is of unfavorable import.

The **color** of the eyes varies in disease. In *conjunctivitis*, the blood-vessels are generally enlarged, and the membrane reddened. In *sclerotitis*, the enlarged vessels are seen *converging toward the margin of the cornea.* In *iritis*, discoloration, *irregularity*, and sometimes fixedness of the pupil occur.

The cornea in old people occasionally exhibits the **arcus senilis**—a sign of fatty degeneration. It is an opacity around the circumference of the cornea.

The *lustre* of the eye is lessened generally in depressing acute diseases, and especially just before death.

The eyes are often remarkably bright during the progress of phthisis. They have a *glare* in some cases of inflammation of the brain, and of mania.

The **pupil** is generally *contracted* in—

Inflammation of the retina;
Inflammation of the brain;
Narcotism by opium.

It is *dilated*, usually, in—

Apoplexy; Amaurosis;
Hydrocephalus; Cataract;
Narcotism by belladonna or stramonium.

An *immovable* state of the pupil, or a *difference between the two eyes* under the same light, gives rise to suspicion of ophthalmic or cerebral disorder.

Photophobia is a dread of or shrinking from the light,

such as occurs in ophthalmia, and in meningitis or cerebritis. Other symptoms connected with the eye are—

Photopsia, flashes of light passing before the eyes.

Muscæ volitantes, moving spots, or spectra.

Amblyopia, dimness of vision.

Diplopia, double vision.

Hemiopia, half-sight; *i.e.* seeing but one-half of an object at a time.

Pain in the head (cephalalgia) may be specially alluded to as depending upon—

Neuralgia;
Rheumatism of the scalp;
Congestion of the brain;
Toxæmia (*e.g.* by narcotics, alcohol, etc.);
Fever (remittent, yellow, typhoid, etc.);
Chronic disease of the brain;
Uterine irritation, etc.

The distinction between these different forms of headache is by no means always easily made out. As a general statement, it may be said that *neuralgic* headache is mostly on *one side* (hemicrania), and extends more or less to the *face;* it is usually accompanied, also, with sensitiveness of the scalp, and is *shooting* or *darting* in its character. *Rheumatism* of the head is attended by *stiffness of the muscles* which move the head from side to side. *Congestive, febrile,* and *toxæmic* headaches are accompanied by *heat* of the head, and are *throbbing* or *pulsating*. That of *uterine irritation* is on the *top* of the head. The pain of *chronic cerebral disease* (tumors, etc.) is commonly *constant* or *periodic, in one spot,* and is attended by some functional disorder.

SYMPTOMS CONNECTED WITH THE PSYCHICAL APPARATUS.

The **expression of the countenance** is usually altered by disease, especially of an acute kind. The change from anxiety or distress to serenity is always a favorable prognostic, except where *gangrene*, or *paralytic anæsthesia* accounts for it.

Great anxiety of expression is seen especially in organic disease of the heart, and in acute disorders of the abdominal viscera. In hypochondriasis, a *sad and desponding* expression prevails.

Terror is shown, by the countenance, in delirium tremens.

Rage, in hydrophobia, and sometimes in acute mania.

Insanity and *imbecility*, although not characterized by any *special* cast of countenance, yet modify its expression so as to enable the mental state to be detected by one accustomed to the observation of deranged persons.

The *facies Hippocratica* is the countenance of extreme exhaustion or of the moribund state.

Delirium is described as being either *active* or *passive*. Active delirium is present in cases of acute meningitis; passive or low muttering delirium, in typhus fever, etc.

Coma presents itself in practice chiefly in four forms: Alcoholic stupefaction; Opium poisoning; Apoplexy; Typhus.

Typhous stupor is generally easy of recognition; the others may give some trouble in the diagnosis. Between narcotism by opium and dead-drunkenness, we have the distinctions, that in opiate poisoning the pupil is almost always *firmly contracted*, and that the breath smells of alcohol (or aldebyde) in the intoxicated subject.

SECTION II.

PHYSICAL DIAGNOSIS.

The *idea* of physical exploration for the purposes of diagnosis has been well defined by Piorry, in the word "**Organography**:" *i.e.* the determination of the actual and relative *position*, material *condition*, and functional *action* of the organs contained within the body. The methods in use for this purpose are modern, dating from Auenbrugger, of Vienna, the inventor of diagnostic percussion, in 1761, and Laennec, the great originator of auscultation, about 1818.

The modes of examination of the chest, abdomen, etc., are—

Inspection; Mensuration; Palpation; Succussion; Spirometry; Percussion; Auscultation.

By **inspection** we estimate, with the eye, the *form*, *size*, and *movements* of the chest, etc.

By **mensuration**, we obtain a more *accurate* knowledge especially of *deviations* and *alterations* of size and form.

Palpation aids in the determination of the character of surfaces and of subjacent parts, and, in the chest, detects changes in the degree or extent of the *movements* of respiration and of the heart, and in the *vibrations* connected with the voice, cough, and breathing.

Succussion, or *shaking* the chest suddenly, is of use occasionally, in establishing the presence of *fluid* in the thoracic cavities.

Spirometry is the measurement of the capacity of the lungs for air.

By **percussion** we learn much of the physical condition of the lungs, heart, and abdominal viscera, through the variations of *resonance* and *resistance* when the walls of the thorax or abdomen are lightly struck.

Auscultation is equally important, but somewhat more difficult in its application, on account of the complexity of the signs afforded by it. It consists in direct *listening* to the sounds produced within the cavities of the body, by placing the ear, with or without the stethoscope, upon the surfaces thereof.

The **Regions** of the *Chest*, for the purposes of physical exploration, may be most conveniently divided into the following:—

ANTERIOR.

Upper and lower sternal;
Right and left clavicular;
Right and left subclavian;
Right and left mammary;
Right and left infra-mammary.

POSTERIOR.

Interscapular;
Dorsal;
Lower dorsal;
Right and left acromial;
Right and left scapular;
Right and left infra-scapular.

LATERAL.

Right and left axillary;
Right and left lateral;
Right and left lower lateral.

The most important peculiarities of these different regions, in the normal state, are connected with *percussion-resonance*. The clearest and fullest sound, on percussion, is given over the *subclavian* and *lateral* regions; the dullest and smallest, over the *acromial*, the *right infra-mammary* (hepatic), and the *left mammary* or præcordial region.

For **mensuration**, various stethometers or chest-measurers have been devised; but, with care and judgment, the common tape-measure will suffice.

The dimensions to be compared are the—

Circular: around the chest opposite the base of the ensiform cartilage. This averages thirty-three inches. The *right half* of the thorax is nearly always half an inch to an inch **larger** in circumference than the *left*.

Transverse: from the nipple to the middle of the sternum.

Vertical: from the clavicle to the lower margin of the ribs.

Antero-posterior: from the clavicle anteriorly to a corresponding point in the scapular region.

General expansion and local bulging of the chest, and general retraction and local depression, are the signs most frequently determined by inspection and mensuration.

General expansion or **local bulging** of the chest, usually upon one side only, may be caused (see *Walshe on Diseases of the Lungs*) by—

Pleuritic effusion;
Pneumothorax;
Emphysema of the lung;
Aneurism, cancer, etc.; or, more rarely, by
Hydrothorax;
Pneumonia;
Incipient tuberculization.

Retraction or **local depression** of the thoracic walls may result from—

Absorption of pleuritic effusion;
Tuberculization;
Pneumonia;
Pleuro-pneumonia;
Infiltrated cancer of the lung.

By **palpation,** we observe **diminution** of the **expansion** *and* **elevation** *of the* **ribs** *in breathing,* in—

Pleurisy;	Emphysema;
Pneumonia;	Intercostal rheumatism;
Tuberculization;	Paralysis;
Pneumothorax;	Hydrothorax.

Increased expansion and elevation of the ribs in breathing occurs in—

Asthma;
Croup;
Spasm of the glottis;
Foreign bodies in air-passages.

Increased vibration *of the walls of the chest* with the **voice** and **cough** is noticed in—

Tuberculization;	Pulmonary apoplexy;
Pneumonia;	Dilatation of bronchi.

Diminished vocal and tussive vibration occurs in—

Pleuritic effusion;	*Emphysema;*
Pneumothorax;	Cancer of the lung.

Rhonchal vibration, occasionally, in bronchitis.

Rubbing, or to-and-fro vibration, in—

Pleurisy;	*Pericarditis.*

Pulsatile vibration in—

Aneurism of aorta;

Cancer of lung or pleura;

Pneumonia.

Fluctuation in—

Large pleuritic effusion.

Purring vibration (frémissement cataire) in—

Aneurism of aorta;

Valvular heart disease;

Anæmia.

For **Spirometry**, Hutchinson's, Pereira's, Coxeter's, and Mitchell's* spirometers have been used.

Dr. Hutchinson made elaborate investigations into the comparative breathing power of individuals, by which he proposed to conclude upon their *vital capacity.* A man of 5 feet 8 inches in height, and 155 pounds weight, was found, on the average, to expire, after a full inspiration, 230 cubic inches.

For every inch of height above this, a definite increase in the quantity breathed was observed. The proportion was *less constant* with *weight* and with *age.* After fifty-five there was a decrease.

In the first stage of *consumption,* the average (for the adult of ordinary height) was found to be 154 cubic inches; second stage, 131; third stage, 108, etc.

In practice, however, spirometry is not extensively used.

Percussion is either *mediate* or *immediate.* In immediate percussion, we tap with the ends of the fingers at once upon the body; in mediate percussion, a pleximeter (*stroke-measurer*) is used. The latter is almost universal; but a

* Consisting of a small *gas-meter,* with a mouth-piece.

difference exists as to the kind of pleximeter employed. Louis and Walshe prefer one made of caoutchouc; Piorry and Skoda, one of ivory; Wünderlich uses an ivory disk, upon which he strikes with a small steel hammer, the head of which is covered with caoutchouc.

A majority of practitioners, however, are satisfied (with good reason) with the use of the *middle finger of the left hand* as a pleximeter. (Percuss by movement of the hand on the *wrist;* not by sledge-hammer motion from the *shoulder.*)

In using percussion as a means of physical diagnosis, we note—

1. The **clearness** or **dullness** of the resonance produced.
2. The **duration** of the resonance.
3. Its **special character.**
4. The **degree of resistance** felt.

Certain terms are in common use to describe particular characters of resonance: as, *wooden* sound, *thigh* sound, *stomach* sound, *tympanitic* or drum-like resonance, *amphoric* or pitcher-like sound, *bruit de pôt fêlé* or *cracked-pot sound,* etc.

It is indispensable, in commencing the study of percussion (or other modes of physical diagnosis), to become familiar with the *normal and natural* sounds observed in *health.* To be anything more than a *routine* diagnostician, moreover, it is necessary to understand the *principle* of the exploration, and, as far as possible, the *reason* of the meaning of every sign.

Two or three very simple facts explain the use of percussion in diagnosis.

When any solid body is struck, the sound elicited varies

according to its *material, form, size,* and, *if hollow,* the *condition of its walls,* and that of its *contents.*

The human thorax (or abdomen) having a certain general form, size, condition of its walls, and proportion of air, blood, and solid structure in its contents, will give forth a certain degree and kind of resonance.

Whatever alters either the *state of its walls* or the *proportion of air, fluid, and solid* contained within them, gives rise to an alteration of percussion-resonance.

Alteration of the state of the *walls* of the thorax seldom occurs in disease in such a way as to modify percussion-resonance. Changes in the proportion of **solid, liquid,** and **air,** in the lungs and pleural cavities, as well as in the similar relations of the heart and pericardium, aorta, etc., are frequent. The *more air,* and the *less liquid or solid* contained within the part of the chest which is percussed, the clearer and fuller the resonance, and, as a general rule, the less the resistance to the finger. Any *increase* in the relative proportion of *liquid* (as in pleuritic effusion), or of *solid* (as in tuberculization), must cause a duller or lesser degree of resonance, and, other things being equal, a greater degree of resistance.

Thus, **diminution** *of* **clearness** *and* **duration** of the percussion-sound, with **increased resistance** of the walls of the chest, occurs in—

Pneumonia;	Pulmonary apoplexy;
Pleurisy;	Hydrothorax;
Tuberculization;	Cancer, etc.

The extent over which dullness on percussion is observed sometimes *varies* with the *position of the patient.* This is

practically important in the diagnosis of *pleuritic effusion, empyema, hydrothorax*, and *hydropneumothorax.*

Increased clearness and **duration** of resonance, with **decrease** of **resistance,** occurs in—

Pneumothorax;	Emphysema;
Atrophy of lung;	Anæmia;
Hypertrophy of lung;	*Emaciation.*

Increased clearness of sound with **increase** of **resistance** is observed when there is a *tubercular cavity near the surface of the chest, with its outer wall thin, hard,* and *adherent to the pleura.*

Tympanitic resonance of the chest is present in—

Pneumothorax;

Emphysema;

Pulmonary atrophy, etc.

Amphoric resonance, when there is a large tubercular *cavity,* with *solid* and *tense* walls, near the surface of the chest.

The **cracked-pot** sound indicates an *anfractuous* cavity, *i.e.* one whose walls are broken or incomplete, communicating with the bronchial tubes. It may be imitated by clasping the hands loosely and then striking the back of one of them upon the knee.

Skoda's classification of percussion-sounds has the merit of great simplicity. He distinguishes them as

Full; empty; (*large* and *small* resonance);

Clear; dull;

Tympanitic; non-tympanitic;

High; low; (pitch).

A sound may be at the same time *full* and *dull,* or *clear* and *empty* (small).

Skoda does not value very highly the information obtained from differences in the *pitch* of percussion sounds. Other authorities differ from him, however, upon this point.

In **auscultation,** as well as in percussion and other modes of physical exploration, a comparison is made not only with the normal standard, but *between the two sides* of the chest.

The *stethoscope* is, in auscultation, generally speaking, a superfluous instrument. If any be used, a simple wooden tube with one end slightly expanded is the best.

The beginner must familiarize himself with the *natural breathing sound,* as heard when the ear is placed over any part of the *lungs,* and with that heard in the *sternal* and *inter-scapular* regions. The latter is **bronchial,** the former is the **vesicular murmur.** The tubular, blowing character of the respiration, as heard in the bronchi, and its soft, breezy nature when the ear is placed over the lungs, are essential elements in diagnosis by auscultation.

The pulmonary vesicular murmur is always *louder in infants and children.* **Puerile** respiration is, therefore, the name given to **exaggerated** breathing-sound in the adult.

In a healthy state of the lungs, the *expiratory* murmur is very faintly heard. A *prolongation,* and increase in loudness, of the sound of expiration, is sometimes a sign of disease (tuberculization).

The sounds detected by auscultation of the chest are divided into **respiratory** and **secretory** sounds, **friction** sounds, and modifications of **vocal resonance.**

RESPIRATORY SOUNDS.

Normal vesicular murmur;

Puerile respiration;
Prolonged expiratory sound;
Harsh, tubular, blowing,
Bronchial, and cavernous respiration;
Amphoric respiration.

SECRETORY SOUNDS.

Dry.

Sibilant rhonchus (hissing or whistling);
Sonorous rhonchus;
Dry crackle.

Moist.

Fine crepitation or crepitant râle;
Coarse crepitant râle (mucous râle);
Humid crackle or gurgling;
Metallic tinkling or dropping sound.

Friction-sounds are peculiar to pleurisy and pericarditis, at the stage of adhesion, or, at least, of effusion of plastic lymph.

Modifications of **vocal resonance** *are—*

Bronchophony;
Pectoriloquy;
Ægophony.

The above is, essentially, the classification commonly adopted by auscultators. That of Skoda is, however, still more simple. He divides *respiratory* sounds into

Vesicular;	Amphoric;
Bronchial;	Indeterminate.

Skoda denies, also, the validity of the distinction between *pectoriloquy* and *bronchophony;* and shows that *Ægophony* cannot have the precision of meaning supposed by Laennec and others to belong to it.

No description of the sounds of **auscultation** can do more than *guide* and *assist* their actual clinical study. For this purpose the simplest and clearest terms are, of course, the best.

The **normal respiratory murmur** as heard in the *lungs*, is well illustrated by Skoda as resembling (during inspiration) the sound caused by narrowing the opening of the mouth, and then drawing in the air. The *consonant* of this murmur is *f* or *p*. The *expiratory* murmur may be represented as somewhere between *f* and *h*. That of the *larynx*, *trachea*, and *bronchi*, by the guttural *ch*, or between that and *h*.

By **bronchial respiration** as a sign of disease in the lung, we mean a breathing-sound heard while listening over the lung, like that normally heard when auscultating the middle regions of the chest, over the bronchial tube. It occurs when the lung is *solidified* or *condensed*. (*Explanation* of bronchial respiration, by *conduction* or by *consonance*. The latter theory, that of Skoda, *preferred*.)

Cavernous respiration is that which is inferred to occur during the passage of air into or out of a *cavity* in the lung (as in tubercular disease). Notwithstanding the truth of the statement urged by Skoda, that it is *often* impossible to draw a certain demarcation between *bronchial* and *cavernous* respiration, yet, in a *sufficient number of cases* this *can* be done, and the term cavernous, therefore, should be retained.

Of the **secretory** sounds, the **sibilant** and **sonorous rhonchi** are the results of narrowing and obstruction, by congestion, mucus, etc. of the bronchial ramules; the *smallest*, in the case of the sibilant or whistling rhonchus;

those *somewhat larger*, so that the air passes through in irregular and varying bubbles, in the sonorous (snoring or roaring) rhonchus. Both of these sounds are characteristic of bronchitis. The use of the term *dry* sounds, as applied to them, is not strictly correct; but it is convenient, as designating the impression which they convey to the *ear* as compared with those technically called moist sounds.

The **dry crackle** is associated with *incipient* or infiltrated *tubercle.*

Among the **moist** sounds, the finest or most delicate is the **crepitant rale,** or fine crepitation, of pneumonia. It is very well imitated by rubbing a few hairs of one's head between the thumb and finger, near the ear. Its *cause* is, probably, the penetration of the air into the air-cells of the lung at a time when their walls are rendered slightly *adhesive* by effusion of coagulable lymph. The gentle *forcing apart* of these adherent walls, or of portions of the viscid lymph itself, produces the fine crackling sound, as a modification of the natural vesicular murmur.

Coarse crepitant or "mucous" râles are heard whenever any fluid exists in the lungs in quantity sufficient to modify respiration without arresting it, whether that fluid be mucus, pus, blood, or serous effusion.

The **humid crackle** or *gurgling* is pathognomonic of advanced tuberculization. It is heard during the later stages of nearly all cases of consumption.

Friction or *to-and-fro* sounds are produced by the rubbing of two surfaces, as of the pleura or pericardium, when made adherent or slightly roughened by inflammatory lymph. It sometimes requires an acute and practised ear to discriminate these from other sounds.

Bronchophony, or bronchial vocal resonance, corresponds in its history with *bronchial respiration.* It is simply a resonance of the voice, to the ear of the auscultator placed over the *lung* of the patient while he speaks, loud, near, and clear, as it is normally when the ear is placed over the *bronchial tube.* The same reasonings will apply to the explanation of this sign by the two theories of *conduction* and *consonance,* which have been urged in regard to bronchial respiration. The *latter* theory, as in that instance, I prefer; but, practically, all agree as to the *circumstances* under which the sign occurs (solidification of the lung).

Pectoriloquy (chest-speaking) is merely a *yet nearer* and *louder* resonance of the voice, heard on auscultation, than that called bronchophony; the sound seeming to be *vocalized* in that part of the lung which is *immediately under the ear.* Skoda objects that this cannot be definitely distinguished from loud bronchophony. But, although this is *generally* true, a certain number of cases occur in which it may be so distinguished, as indicative of a very different pathological state of the lungs, viz., a large cavity.

Aegophony, bleating, or goat-like resonance of the voice, has been, since Laennec, supposed to be an almost certain sign of the existence of *pleuritic effusion* or *hydrothorax.* Skoda's observations, and those of others also, show that it is occasionally heard in pneumonia, in phthisis, and even in the healthy state of the thoracic organs. It is, therefore, not *pathognomonic* of the presence of fluid within the pleura; but it is among the signs which render that diagnosis probable.

Amphoric resonance is heard especially in connection with the sound produced by *coughing.* A tense condition

of the walls of a large cavity will explain it, as well as the phenomenon called *metallic echo* of the voice or cough.

Metallic tinkling is usually accounted for by the *dropping of fluid* in a large cavity (as in hydropneumothorax, with collapsed lung) with tense walls.

Resuming the consideration of **respiratory sounds, puerile** *or exaggerated respiration* occurs in the *healthy* lung, or part of the lung, when the *other* lung or portion of the same is *obstructed*, as by a foreign body, or by bronchitis; *condensed*, as by

Pneumonia;	Pleuritic effusion;
Tuberculization;	Tumor.

A lung permanently expanded by *emphysema*, or *hypertrophied*, will also give an exaggerated vesicular murmur; and, transiently, this is observed in a lung *just released* from the paroxysmal obstruction of *asthma*.

Feeble respiratory murmur is heard in one or both lungs in cases of

Croup;	Pulmonary apoplexy;
Foreign bodies in air-passages;	Emphysema;
	Pneumothorax;
Bronchitis;	Hydrothorax;
Pneumonia;	Intercostal rheumatism;
Pleurisy;	Paralysis;
Asthma;	Cancer; or other
Infiltrated tubercle;	Tumor.

Harsh respiratory murmur, passing by gradations into **blowing** and **bronchial**, in

Dry bronchitis;	*Pneumonia;*
Incipient tubercle;	Pulmonary apoplexy;
Pleurisy (condensing lung);	Bronchial dilatation.

Cavernous respiration, in case of

Tubercular cavity;

Excavation from

Abscess of lung;	Softening of cancer;
Gangrene;	Large bronchial dilatation.

Amphoric respiratory sound is particularly associated with the existence of a fistulous opening between the pleural cavity and one of the bronchial tubes; the cause of which fistula may be either tuberculous softening, or abscess, etc.

The **sibilant** and **sonorous rhonchi** occur nearly always in *bronchitis;* occasionally in pulmonary *emphysema,* and when the bronchi are pressed upon by tumors, etc.

Dry crackling indicates the existence of hard tubercle in the lungs.

Humid crackling or **gurgling,** tubercle in the softened state.

The **crepitant râle** has already been explained as peculiar to pneumonia.

The **coarse** crepitant* *râle,* or **mucous** râle, is observed frequently in

Capillary bronchitis;	Pulmonary *hemorrhage;*
Bronchorrhea;	Pulmonary *œdema;*
Late stage of *pneumonia;*	Pulmonary *abscess.*

Friction sounds have been already alluded to as connected with *pleurisy* and *pericarditis.*

Resonance of the voice is feeble in

Emphysema; Atrophy of the lung; Pneumothorax.

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* The term *sub*-crepitant râle or rhonchus, appears to the author to be very objectionable, as leading to confusion.

Bronchophony occurs in case of

Tubercle;

Hepatization (pneumonia);

Pleurisy (condensing lung); *Cancer;*

Dilatation of bronchi.

Aegophony, in

Pleurisy; Hydrothorax; Pneumonia.

Pectoriloquy, in case of

Tubercular cavity;

Dilatation of bronchi;

Excavation from

Abscess; Cancer; Gangrene.

Metallic tinkling and **echo,** in

Pneumohydrothorax;

Large tubercular cavity.

The *sounds of the* **heart** *are heard at an unusual distance from the heart itself,* in some cases of

Pneumonia;	Pleurisy;
Tubercle;	Cancer, etc.

(This affords some argument for the *conduction* theory of Laennec.)

Displacement of the heart, diaphragm, liver, spleen, stomach, sometimes occurs from pleuritic effusion or empyema, cancer of the lung, etc.

The physical diagnosis of **diseases of the heart** is conducted upon exactly the same principles as that of affections of the lungs and pleura.

By **inspection** we can detect bulging or distortion in the præcordial region, and, in some cases, judge of the extent,

force, and character of the heart's *impulse*. By **mensuration**, changes in the thoracic dimensions consequent upon diseases of the heart can be more accurately determined.

By **palpation**, the *impulse* of the heart may always be examined and estimated. This is very important, not only in actual *diseases of the heart*, but also in *fevers*, etc.; in the course of which the movements of the heart, as the centre of the circulation, are often seriously affected.

In *hypertrophy*, this impulse is *increased in force*; in *dilatation*, it is *extended;* in *atrophy*, it is *diminished*.

Percussion aids us in detecting some very important pathological changes in the heart; as *hypertrophy, dilatation, pericarditic effusion*. The percussion resonance is *unusually clear* in *atrophy* of the heart.

In **auscultation** of the heart there is often a convenience, although no necessity, in the use of the stethoscope. The learner must in the first place make himself familiar with the *natural sounds* of the heart.

The **first** sound is the longest and loudest; the succession being imitated by the syllables *lubb, dupp*. If the time from the commencement of one pulsation to that of another be divided into five equal parts, *two* of them will be occupied by the first sound, *one* by the second, and *two* by the interval of repose.

The first sound accompanies the *systole* or contraction of the *ventricles;* the *impulse* of the heart occurs at the same moment. The second sound is *diastolic* as regards the ventricles.

The *causes* of the first sound are believed to be the contraction of the powerful ventricular muscles, the *tension of the closed auriculo-ventricular valves*, the rush of blood

into the great vessels, and the impulse of the heart against the walls of the chest.

The cause of the **second** sound has been proved to be the *flapping together*, during the diastole or dilatation of the ventricles, of the pocket-like, *semilunar valves* of the **aorta** and pulmonary artery.

The essential points in the "medical anatomy" of the heart are as follows:—

The *semilunar valves of the* **pulmonary artery** lie behind the junction of the cartilage of the third rib with the sternum.

The *semilunar valves of the* **aorta** are just *below* these, between the cartilages of the third and fourth ribs.

The **tricuspid** or *right auriculo-ventricular valve* is behind the sternum, on a level with its articulation with the fourth rib.

The **mitral** or *left auriculo-ventricular valve* lies behind the cartilage of the fourth rib, a little to the left of the sternum.

The *heart's* **apex** *strikes*, during the impulse, at a point just below and outside of the left nipple. The point of greatest dullness on percussion is slightly within the left nipple. The diameter of the *normal* region of dullness does not exceed two inches.

Using terms of *convenience* merely, the valves of the heart may be said to be of two kinds: *cavity* valves and *vascular* valves. The cavity valves are both nearer to the *apex* than to the base of the heart; the vascular valves (aortic and pulmonary arterial) nearer to its *base, i.e.* as the heart is situated in the chest, its *upper* part.

By auscultation of the heart we may detect **valvular**

murmurs, **anæmic** *murmurs*, and **friction** *sounds*. Details in regard to these can be best given in connection with the *special pathology* of the heart. A few main points only require mention here.

The valves of the **left** or *systemic* portion of the heart are much more often affected by disease than those of the *right*. Practically, in most cases, those of the right side may be left out of the question of diagnosis.

The following is Harvey's statement of the comparative frequency of the different valvular affections :—

1. *Aortic obstructive.*
2. *Mitral regurgitant.*
3. *Aortic regurgitant.*
4. Aortic obstructive and mitral regurgitant together.
5. Aortic obstructive and regurgitant together.

If a murmur (not anæmic) is **systolic**, *i.e.* is heard with the *first sound* of the heart, and is loudest at the **base** of the heart, it may be inferred to be **aortic obstructive.**

If **systolic**, and loudest at the **apex, mitral regurgitant.**

If **diastolic**, *i.e.* with the *second sound*, and loudest at the **base** of the heart, **aortic regurgitant.**

If **diastolic**, and loudest at the **apex, mitral obstructive.**

The *rationale* of these inferences is explained by the physiology of the heart's action, in connection with the position of the several valves.

Much complexity attaches necessarily to the *exact* diagnosis of affections of the heart; but we have the excellent authority of Dr. Stokes for the principle, that the *important practical* questions in each case are—do the abnormal sounds present have origin in **organic** disease or lesion, or

not? and, how far is the **functional action** and *capacity* of the heart interfered with or impaired?

Upon these, as upon all other questions in diagnosis, it is proper *never* to *confine our attention to physical or immediate signs alone.* To rest either upon symptomatology or physical exploration *exclusively*, would be like hopping constantly on one foot, instead of walking upon two.

Friction sounds, in the region of the heart, are connected with *pericarditis.* Their *narrow limits*, and *association, in time*, with the *sounds* of the *heart*, serve usually to contrast them with *pleuritic* sounds. It is sometimes difficult to distinguish them from *valvular murmurs.*

The signs of **aneurism** *of the thoracic* **aorta** may be alluded to in another place. They are, chiefly: 1. A *second impulse* (often with a *thrill*), apart from that of the heart. 2. Dullness on percussion. 3. Bulging. 4. *Symptoms of dyspnœa, cough*, and *dysphagia*, from pressure upon the trachea, œsophagus, etc.

The physical diagnosis of **abdominal** affections comprises inspection, mensuration, palpation, percussion, and auscultation. The belly is divided, externally, into the *epigastric, umbilical, hypogastric*, two *hypochondriac*, two *lumbar*, and two *iliac* regions.

By abdominal **inspection** we can observe the alteration in size and shape caused by *pregnancy, hernia, tympanites, ascites*, or *ovarian dropsy.* By **mensuration**, we can ascertain the *exact changes* which may occur from time to time in dropsical accumulations, etc.

By **palpation** of the abdomen, we may develop the symptom of local *tenderness on pressure:* as in *gastritis, he-*

patitis, peritonitis, cystitis, etc. By the same method of examination, more forcibly employed, we detect *enlargement* of the *liver* or *spleen, ovarian tumor, mesenteric disease, cancer, aneurism, fæcal accumulation,* etc.; and, with the aid of both hands, prove the presence of *fluid* (ascites, etc.) by the sign of *fluctuation.*

Percussion assists materially in the diagnosis of diseases of the abdominal viscera. The ordinary percussion-resonance, in health, is clear, full, and *slightly* tympanitic, all over the abdomen. It becomes more drum-like in distention of the intestines with gas (meteorism), or in tympanitic distention of the peritoneum. *Dullness* of resonance occurs, with limits and peculiar characters, in *enlargement of the liver or spleen, ascites, ovarian dropsy, pregnancy, cancer, aneurism, retention of urine, fæcal accumulation,* etc.

Auscultation of the abdomen is especially useful in the diagnosis of *pregnancy,* by detecting the sounds of the fœtal heart, and the placental *soufflet.*

Morbid sounds are occasionally appreciable in abdominal affections, as in tape-worm, etc.; but they are subject to so much uncertainty as to be hardly available for practical purposes.

INSPECTION OF THE BODY AFTER DEATH.

In conducting post-mortem examinations, with a view either to pathological study or medico-legal investigation, *order* and *method* are of great importance.

The three great cavities—the **head,** the **chest,** and the **abdomen**—should always be examined, whether suspicion of disease in them exist or not. First, however (the autopsy being made from twelve to thirty-six hours after death), we should note the **external appearance** of the body; its *size, weight, conformation, color of the skin*, etc. (In cases of suspected violence even abrasions should be minutely described.)

To examine the **Head,** an incision should be made through the scalp, across the top of the head, from ear to ear—the two flaps thus formed should be reflected, the one over the forehead, the other over the occiput. The nature of the attachment of the occipito-frontalis muscle to the bone beneath is such as to allow, very easily, the loosening of the scalp. The cranium (calvaria) is now to be removed by means of a small saw.

For the purpose of holding the head firmly during the use of the saw, Dr. Demmé has furnished, as a substitute for the craniotome of Mr. Lund, of London, a *cranium-holder*, which enables the operator to make a section of the skull in any direction. It consists simply of a bar of iron curved like the letter U, at each extremity of which two drill screws are placed, which, when forced down upon the bone, hold the bar firmly in situ, and enable the examiner

to control the head. The legs of the instrument, for use, are placed upon the lateral portions of the skull, over the squamous portions of the temporal bones.

The section of the cranium with the saw should be made through its outer table, completely around the head—from *before, backward,* from below the frontal protuberances to the squamous portion of the temporal bone, and from *behind, forward,* from the occipital protuberance to the squamous portion of the temporal bone, meeting the line just described. The shape of the piece thus cut out enables it to be maintained in its proper position when the parts are readjusted. It is removed by the aid of an elevator or chisel, and hammer, fracturing the inner table of the skull by strokes so applied as not to pierce the brain.

The dura mater is next to be cut through, on each side of the superior longitudinal sinus; after which, dividing the *falx cerebri,* the brain may be raised carefully with the hand placed under its anterior portion. The internal carotid artery, and cranial nerves, etc., are now to be severed by the knife, and, finally, the vertebral arteries and spinal cord. The brain itself may then be taken out, and inspected, by slicing it, from the upper part downward, in successive horizontal layers.

To examine the **spinal column,** an incision should be made from the occipital protuberance to the extremity of the os coccygis. The deep muscles of the back should then be loosened from their attachments, so as to expose the laminæ and spinous processes of all the vertebræ. With the chisel and mallet, or saw, we must cut through the arches of the vertebræ on each side, close to their articular processes. After thus opening the spinal canal, the cord

is to be exposed by dividing the dura mater through its whole length.

To examine the **Neck**, an incision should be made through the skin, extending from above the hyoid bone to the upper part of the sternum. Avoiding penetration of the large veins of the neck, the parts to be examined may be carefully dissected, and, if desirable, removed from the body. The thyroid gland, larynx and its appendages, tongue, pharynx, œsophagus, blood-vessels, and nerves of the neck, may be thus viewed.

To examine the **Chest**, two incisions are desirable: the one from the root of the neck, in front, to the extremity of the ensiform cartilage; the other at right angles to this, across the middle of the thorax. The cartilages of the ribs are to be cut through at the line of junction with the ribs. The ensiform cartilage, being drawn outward, is to be detached from the soft parts, the knife being held *close to the sternum*. The sterno-clavicular articulation may now be opened, and the sternum with the costal cartilages raised from its position—a cautious use of the knife being made to remove the adherent soft parts.

The thoracic viscera are now exposed, and may be drawn out with care, and inspected in detail.

To examine the **Abdomen**, make a crucial incision: the one branch extending from the sternum to the pubes, passing to the left of the umbilicus; the other, transversely across the middle of the abdomen. Care must be taken, in making these incisions, not to injure the subjacent viscera.

Before removing the stomach or any portion of the intestines, ligatures should be placed above and below the part that is to be separated.

When—as is always desirable if possible—both of the large cavities of the trunk are to be opened, a single incision, extending from the top of the sternum to the symphysis pubis, may be made.

In every case incisions through the skin should be made, as far as practicable, only in those parts which are usually covered by the clothes of the deceased. It is generally advisable, when the abdomen or thorax has been opened, to fill the cavities with bran or sawdust. After the examination has been completed, the edges of the divided integument should be brought together, and retained in apposition by the common suture.

The following is Professor Bennett's* summary statement of the subjects especially claiming attention during an autopsy:—

. I. **External Appearances.**—Number of hours after death. General aspect and condition of the body; peculiarities of person; marks on the surface; suggillation;† amount of decomposition. In cases of suspected death by violence, great minuteness in the external examination is necessary.

II. **Head.**—Scalp; calvaria; meninges; choroid plexus; brain, its form and weight; cerebellum, its weight; cortical and medullary substance of brain; ventricles, exact quantity of fluid in each—which should be removed with a pipette—its character; medulla oblongata; nerves and arteries at the base of the brain; base of cranium; sinuses.

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* Clinical Medicine, Phil. ed., page 25.

† Suggillation is discoloration, in spots, resembling those produced by *ecchymosis* (extravasation of blood) during life.

III. **Spinal Column.**—Integuments over spine; vertebræ; meninges; cord; nerves.

IV. **Neck.**—Thyroid gland; larynx and its appendages; trachea; tongue; tonsils; pharynx; œsophagus.

V. **Chest.**—Thymus gland; lining membrane of bronchi; bronchial glands; pleuræ; contents of pleural cavity; parenchyma of lungs; large thoracic veins; pericardium, its contents; general aspect and position of the heart, its weight; amount of blood in its various cavities; right auricle; coronary veins; auricular septum; right ventricle, size of its cavity; thickness and degree of firmness of its walls; endocardium; tricuspid valve; pulmonary artery, its calibre; pulmonary veins; left auricle; mitral valve; left ventricle; thickness and condition of its muscular tissue; size of its cavity; sigmoid valves; coronary arteries; aortic opening and arch; large arteries of the neck; thoracic aorta, its structure and calibre.

VI. **Abdomen.**—Peritoneum and peritoneal cavity; omentum; position of abdominal viscera; stomach; duodenum; small and large intestines; liver, its weight, form, and structure; supra-renal capsules; kidneys, weight of each; secreting and excreting portions; pelvis; ureters; bladder; with the prostate and urethra in the male; in the female, uterus, ovaries, Fallopian tubes, vagina; abdominal aorta and vena cava; large abdominal arteries and veins; ganglia of the sympathetic system.

VII. **Blood.**—Appearance in the cavities of the heart, in aorta, vena cava, vena portæ, etc.; coagulated and fluid portions, adhesions or not of the former.

VIII. **Microscopic examination** of all the morbid structures and fluids, the blood, etc.

PART III.

GENERAL PATHOLOGY.

The **seat** of disease may be

In the **constitution**: *e.g.* secondary syphilis; tuberculosis.

In special **tissues**: *e.g.* mollities ossium.

In particular **apparatus**: *e.g.* dyspepsia; hysteria.

In individual **organs**: *e.g.* pneumonia; cirrhosis; hydatids.

In the **blood**: *e.g.* anæmia; scorbutus; cholera.

Morbid states of the **system**:—

Over-excitement;

Fever;

Depression;

Exhaustion;

Degeneration of organic force (cachexia);

Toxæmia.

Morbid states of **organs**:—

Over-excitement;

Hypertrophy;

Irritation;

Inflammation;

Hyperæmæsthesia or "chronic inflammation;"

Atony; Exhaustion;

Atrophy;

Degeneration or Kakotrophy.

Of the above, the *most important general or systemic* morbid states may be included under **fever, toxæmia,** and **cachexia;** constituting a sort of "tripod" of systemic disease.

A similar tripod of the most frequent and important *local* disorders may be established, of **irritation, inflammation,** and **atrophy.**

In using the term **fever,** as applied to a morbid *state* of the system, we must remember that the same word is also used as a part of the designation of several *complex diseases:* as typhus fever, yellow fever, remittent fever, etc. This double use of the word is unfortunate, but cannot now be avoided.

SYMPTOMS OF FEVER.

Increased heat of the whole body;
Dryness of the skin, mouth, etc.;
Diminution in *bulk* of the *excretions;*
Muscular debility;
Frequency of the pulse;
Functional disturbance of stomach, brain, etc.

Heat is the most essential characteristic of the febrile state, having given name to it in all languages.

Notwithstanding the scantiness in *quantity* of the stools, urine, and perspiration in fever, it has been shown by Virchow, Vögel, Böcker, Parkes, Jenner, and Hammond, that the *actual amount of solid matter excreted,* especially by the kidneys, *is increased.* Although none of these observers have made chemical examination of the *expired air* during fever, we have, in the *heavy, offensive odor* of the breath, evidence that it, too, contains an exces-

sive amount of decomposing organic material. It is highly probable, also, that *much excrementitious matter is*, during fever, *retained in the blood.* It has been observed that if a *local inflammation*, as pneumonia, occurs during the febrile attack, the *excess of excreted solids* (urea, etc.) *disappears* until the inflammation has passed.

This increase of the disintegration of the substance of the body (tissue-metamorphosis) is, at present, one of the most prominent and interesting phenomena connected with the pathology of fever. The whole subject, however, is surrounded by obscurity, notwithstanding the fact that the *symptoms* and aspects of the febrile state have been familiar ever since man became a prey to disease.

On the basis of the facts observed and scrutinized at the present time, I think we may venture to throw out a comprehensive **theory** of fever. Thus,—its essential phenomenon is increased **heat** of the body; this being produced by **excessive tissue-metamorphosis,** under an abnormal "tension-condition" (Virchow) of the **ganglionic nerve-centres;** which abnormal condition is the result of (Addison) either 1, **corpuscular** toxæmia, or 2, **plasmic** toxæmia, or 3, (Campbell & Müller) sympathetic **irritation** from local inflammation.

A pathological classification of fevers, convenient for some purposes, is, into **irritative, reactive,** and **toxæmic** fevers.

Toxæmia, more properly *toxicohæmia,* (from τοξικον, poison, and αἷμα, blood,) is a term used to indicate *poisoning of the blood.*

After all the long and reiterated disputes between the

advocates of the exclusive *solidist* and *humoral* pathologies, it has now become a matter of general recognition among medical observers and reasoners, that *both* the fluids and the solids are involved in almost every disease—their mutual interdependence making the contrary impossible.

Certain diseases, however, more than others, are believed, upon the strongest evidence, to depend upon a chemical and dynamic *change in the blood*, to which the name of **toxæmia** is applied.

Toxæmia originates in at least two ways:—1. By the introduction into the blood of **morbid poisons** *from without*, as in the case of syphilis, small-pox, remittent fever, etc. 2. By the **non-excretion**, and consequent accumulation in the blood, of post-organic or **excrementitious** substances, which, by their own properties, or by the chemical changes they undergo, prove injurious to the system. *Obstructive jaundice*, and *uræmia*, afford the best examples of this last occurrence.

All of the **zymotic** diseases (*e.g.* exanthemata, cholera, yellow fever, diphtheria, etc.) have their origin explained by the first of these modes of blood-poisoning.

Yet, our knowledge of the very existence of several of these "morbid poisons" is inferential only. Our idea of their nature is conjectural; and our reasonings upon their mode of action upon the blood and system at large are entirely speculative.

Some facts, however (see *Simon's Lectures on Pathology*), are well deserving of notice.

1. The **effects** of these poisons, when introduced into the body, are, both **local** and **constitutional** symptoms. The *constitutional* symptoms, which begin the attack, are

nearly alike for them all—the *local* symptoms are *peculiar for each one.*

2. The small-pox virus is the most readily studied of all of these causes. This material is evidently **volatile,** as it acts often through *considerable distances;* and it is **soluble,** because it infects, sometimes, the fœtus in utero, which has no communication of fluids with the mother, except by placental *endosmosis.* The poison of **primary** *syphilis* is not thus transmissible, although it is directly **contagious** by *inoculation;* that of **secondary** syphilis is *not** contagious, but *is* **transmissible** by descent.

3. **One** attack of small-pox, scarlatina, measles, hooping-cough, usually gives **immunity** for the rest of a lifetime. It may, from this, be argued, that besides the *materies morbi* or *causative* matter, *another* material must exist *in the blood* of the susceptible person, which *combines* with the former (thus producing *the disease*), and which is *exhaustible.* (Illustration: the saturation of a carbonated alkali by an acid; after a certain portion of the latter is added, it will *cease to effervesce* with any subsequent addition of the same).

Vaccination can be best explained upon this view. Just as more than one acid will neutralize potassa or soda, etc., so that after it has been saturated with sulphuric acid it will not react with nitric—so the virus of the vaccine disease appears capable of *saturating* and *exhausting that material in the body, the presence of which constitutes the susceptibility to variola.*

No such immunity after a single attack is found to exist

* Recent experiments have occasioned some doubt as to the entire correctness of this commonly accepted statement.

in the case of the **miasmatic fevers** (remittent, intermittent). The element in the blood for which *their* morbid poison has affinity is, therefore, **not exhaustible.** Several reasons exist for conjecturing this element to be the **red corpuscles** themselves.

Of the different hypotheses propounded in regard to the *modus operandi* of "zymotic" (*i.e.* epidemic, endemic or infectious) causes upon the blood, that which has best stood its ground is that of **catalysis,** or *continuous molecular action.*

Toxæmia from **non-elimination** of the **excretions** is seldom, if ever, an *idiopathic* affection. It is, therefore, best studied in connection with those disorders of which it forms a secondary or resultant, although important part.

Cachexia (from κάκος, bad, and ἕξις, habit,) is usually understood to mean a *depraved habit of system;* an error of development and nutrition affecting the general state of the organs and functions with perversion or debility.

There is, at the same time, no reason why we should not speak of **local** as well as general cachexiæ. Although not usual, I have introduced this mode of employment of the term in our department of *Nosology.*

The history of the different cachexiæ would not be in place here—belonging rather to *Special Pathology* and *Nosography.*

A few words must be said, however, upon the very important subject of **tuberculosis.** We shall have space only for the *main points* concerning it. In regard to *most* of these, there is a general agreement among pathologists and clinical observers.

1. **Tuberculosis** and **Scrofulosis** are **identical.** The term *scrofula* is generally applied to certain slow inflammations, abscesses, ulcerations, and other disorders of the skin, mucous membranes, glands and bones, which occur especially in young persons, and are characterized by the *moderate* degree of vascular excitement attending them, with the great *obstinacy* or *chronicity* of their career. In many cases, also, of external scrofula, particularly in the glands, a deposit of curd-like or cheesy material is found, *not distinguishable from tubercle.*

2. Of the **causes** apparently connected with the production of the tubercular or scrofulous diathesis (to which the general name *tuberculosis* may be applied), the most obvious and constant is *hereditary* **predisposition.**

3. This diathesis may, however, undoubtedly be **acquired** without inheritance. *Change of* **climate,** from a warm to a *cold and damp* locality, will often induce it. Other **depressing** influences promote it, such as want of *food, light,* or *warmth,* sedentary habits, etc. But all of these often fail to generate any form of tubercular disease.

4. Tuberculosis may be pathologically defined as a constitutional tendency to the formation of blood, the plasma of which is defective in organizable capacity; so that, in nutrition, instead of healthy tissue, it forms, in one, or very often in many, of the organs, **aborted blastema,*** which accumulates as a deposit. This deposit is called tubercle; the process, **tuberculization.**

5. But the tubercular **diathesis** (tuberculosis) may exist *without tuberculization.* Its influence is then shown, especially, in **modifying** *inflammatory* or *other morbid*

* From *βλαστανω,* I *bud;* used to mean *tissue-forming material.*

processes; giving them a *lower, slower,* and more persistent or intractable type. Thus, many cases of what is called *tubercular meningitis* in children occur, with fatal result, in which (Bouchut, Hughes Wilshire, etc.) *no tubercular* **deposit** *is found;* yet the disease is modified by the diathesis.

6. Tubercle is distributed either in **regularly-formed** masses (miliary tubercles, etc.), or **irregularly,** through the tissue of organs. The most amorphous (shapeless) and homogeneous examples of it are called **infiltrated** tubercle. The *size* of the masses of tubercle varies from that of a pin's head to that of a hen's egg.

7. The two essential varieties of tubercle are the **semi-transparent, gray, granular,** and the **yellow, opaque, caseous** tubercle.

8. **Neither** of these forms ever undergoes **organization.** They are never *vascular.* They are deposited **outside** of the blood-vessels only, and not in *non-vascular* tissues, such as cartilage, etc.

9. The **gray** tubercle, when *alone,* is subject (Rokitansky) to one change only, **cornification;** *i.e.* drying into a horny substance as hard as a shot. When *with the yellow* tubercle, the gray may undergo **softening.**

10. **Yellow** tubercle *usually* **softens;** sometimes it **cretifies;** *i.e.* becomes chalk-like, by degeneration.

11. The softening of tubercle is **spontaneous;** not depending upon any agency of surrounding parts. In regularly formed tubercles it commences at the **centre;** in the irregular, at *any* part. *Tuberculous* **softening** must not be confounded with **suppuration** of inflamed tissue; although they are often mingled.

12. Examined with the microscope, tubercle is found to consist essentially of: 1. An **amorphous,** *granular* material, containing *irregular solid* corpuscles (tubercle-corpuscles), considered (Virchow) to be **shriveled nuclei.** 2. Elements of **disintegrated tissue** of the part involved; as epithelial cells, fibres, etc. 3. Results of **degeneration**; *e.g.* oil-globules, pigment, calcareous particles, etc. 4. Results of **inflammation** of surrounding parts; lymph, pus, exudation-corpuscles. 5. Extravasated **blood-corpuscles,** from hemorrhage, the effect of obstruction or ulceration of vascular trunks.

13. Tubercle contains, then, **no specific,** heterologous **form.** All that it holds is the consequence of abortion and degeneration.

14. The process of **tuberculization** or deposit of tubercle in the organ may occur (Rokitansky)—

a. **Insensibly,** in the course of ordinary nutrition.

b. With **hyperæmia,** or local determination of blood.

c. With **inflammation**; *i.e.* as a *product* or concomitant of the inflammatory process.

15. The effects of the tubercular deposit *upon the part* are: 1. **Obstruction,** and arrest or impairment of function. 2. **Inflammation**; *e.g.* in phthisis pulmonalis (consumption), which has, in its usual form, been designated (Condie) *tubercular pneumonia,* from the common occurrence of inflammation of the lungs with the deposit of tubercle. 3. **Ulcerative destruction** of the tissue by the repeated new formation and softening of tuberculous matter, producing **cavities.**

16. Tubercle, once thrown out, is never (as a whole) *absorbed.* It can only be **eliminated, cretified,** or **cornified.**

Elimination is the most common. After this has happened, sometimes *callous* cavities are formed by a process of **cicatrization.**

17. The *order of frequency* with which different organs are affected with tubercle is (Rokitansky) as follows :—

Lungs;	Spleen;
Intestines;	Kidneys;
Lymph glands;	Liver;
Larynx;	Bones;
Serous membranes;	Uterus;
Brain;	Testicles.

Except in the case of *children*, in whom the *lymph-glands* and the spleen stand first on the list.

18. But the organs most frequently *first invaded* by tubercle are, at all times of life, the **lungs** and **lymph-glands.**

19. The *parts especially preferred* by tubercle for its deposit are, in the lungs, the apex; in the pia mater, about the base of the brain; in the brain, the gray substance; in bones, the cancellated structure; in the bowels, the lowest part of the ileum; in the testicle, the epididymis; in the female generative apparatus, the Fallopian tubes and fundus of the uterus.

20. The immense experience of Rokitansky gives origin to the statement that tubercle has certain general **incompatibilities**; the most important of which are, with cancer, with typhus, with ague, and with goitre (bronchocele, enlargement of the thyroid gland). These incompatibilities are, however, *general*, not *universal;* as, for instance, a considerable number of cases have been observed, in which cancer and tubercle were undeniably present in the same patient.

21. The only possible **cure** of tubercular disease (*e.g* of the lungs in phthisis) after the deposit has occurred, consists in the total **elimination** (or absolute quiescence by cornification or cretification) of the tuberculous matter, and *improvement in the general* **hæmatosis** (*i.e.* blood-formation), so that *no new tubercle is formed.* The two great indications, therefore, in the treatment of pulmonary consumption (Radclyffe Hall) are, to gain **time** and **tone**: *time*, by allaying or preventing pulmonary or bronchial inflammation and irritation; and *tone*, by strengthening the patient's system by all possible hygienic and therapeutic measures.

GENERAL PATHOLOGY OF AFFECTIONS OF ORGANS.

Hypertrophy is, strictly, *overgrowth;* an increase of the size and weight of a part without change of tissue. It is only in recent times that this has been clearly distinguished from *enlargement with alteration of tissue;* which is really, in many cases, a *degenerative* change, and therefore akin rather to *atrophy* than to hypertrophy.

Hypertrophy is often, *per se*, physiological or natural; although depending on a morbid or pathological cause. When the bladder, for instance, becomes hypertrophied in consequence of obstruction by an enlarged prostate, although the *latter* is morbid, the increase in the strength and thickness of the muscular coat of the bladder is as normal as is that of the uterus during gestation; in due proportion to the necessities of its use.

A constant law of the animal economy is, that, within certain limits, the **growth** of an organ is in proportion to

its **exercise**; provided that this exercise is not too violent, and is alternated with sufficient periods of repose.

The three **causes** of hypertrophy, then, are (see *Paget's Surgical Pathology*):—

1. Increased *exercise* of a part in its healthy functions.

2. Increased accumulation in the blood of the particular *materials* which a part appropriates in its nutrition or secretion.

3. Increased *afflux* of healthy *blood* to the part.

We may illustrate the first of these modes of causation by the blacksmith's arm, the legs of the *danseuse*, the cuticle of the laborer's hands, *the heart* in cases of *valvular obstruction*, etc.

An example illustrative of the second is found in the enlargement of a healthy kidney, when the opposite one fails, from disease, to remove from the blood its due share of urea, etc.

The third is exemplified in the large growth of hairs around an inflamed ulcer or osseous fracture; by the growth of the bones of the limbs when their nutrition is increased by exercise; by hypertrophy of bones, a portion of which has been subject to disease with vascular excitement; and by Hunter's interesting experiment of the transplantation of the spur of a cock to its *comb*.

Adaptative hypertrophy is remarkably seen in the changes undergone by the skull in proportion to its contents. The cranium is subject to—1, eccentric, and 2, concentric hypertrophy. The first occurs in cases of *hydrocephalus*, the second in cerebral *atrophy;* the bony case in the one instance *expanding* with its contents, in the other *thickening* so as to fill up the abnormal void.

Corns illustrate hypertrophy extremely well.

Intermittent pressure, or attrition, causes *hypertrophy; constant* pressure, *atrophy* or absorption.

The formation of corns upon the foot illustrates the former of these laws; the wasting away of vertebræ under the incessant pressure of an aortic aneurism affords an example of the latter. (*Chinese woman's foot, with corns*, exemplifying *both*.)

Atrophy requires but a few words in this place. Simple atrophy is exactly the reverse of simple hypertrophy; viz., wasting and diminution of a part, without change of structure. But most pathologists include also under the same term such defects of nutrition as result in **degenerative** changes; constituting the two classes of—1, **quantitative**, and 2, **qualitative** atrophy. The latter (*e.g.* fatty degeneration) is frequently attended by *increase* instead of diminution of *bulk* in the parts affected.

The **causes** of atrophy are:—

1. Deficient *exercise* of a part;
2. Deficiency in the *supply of blood;*
3. Defective supply of *nervous influence;*
4. *Disease* (inflammation, etc.) in the part.

Of the first of these, the atrophy of the mamma of the old maid may afford an example.

Of the second, softening of a portion of the brain from the obstruction of one of its arteries by a coagulum. (Paget's examples of atrophy of the heart.)

Of the third and first together, the muscles of a paralyzed limb.

Of the last, there are many instances familiar to the pa-

thologist, although obscurity often attends their individual history; as, the *gouty kidney*, etc.

Quantitative or qualitative atrophy may affect the heart, arteries, brain, muscles, bones, liver, kidneys, pancreas, testicles, etc., and *morbid products*, *e.g.* inflammatory exudations, cancer, etc.

Qualitative atrophy, or **degeneration**, will be again alluded to presently.

Irritation and **inflammation** are at once the most familiar in their phenomena, and the most obscure in their nature, of all pathological processes or occurrences. I shall confine myself to a broad statement of what I believe to be the most important truths concerning them; although a somewhat argumentative tone may be unavoidable, upon topics which are subject to so much controversy.

Stimulation and **irritation** are often inconveniently confounded. It would be desirable to confine the *former* term to excitation *within physiological* (*i.e.* healthy or normal) *limits;* applying the *latter*, irritation, only to such an *excessive* action upon a part as produces *morbid* effects.

With this, which seems to me a necessary postulate—I would define **irritation** as an *arrest of vital movement in a part.* This could only be elucidated, by an extended allusion, inappropriate here, to the *correlation of physical and vital forces; life* being considered as *a molecular motion.*

In regard to the *circulation*, to the old and accepted maxim—

Ubi *stimulus*, ibi *affluxus*—

may be added a second—

Ubi *irritatio*, ibi *stasis.*

And, anticipating the account about to be given of *inflammation*, a third—

Ubi *phlogosis*, ibi *effusio*.

The **stasis of irritation** may be either *partial* or *complete; limited* to a very small surface, or widely *extended;* and *transient*, or *continued* for a considerable time.

If *complete, extended,* and *continued* in a tissue at all vascular, **inflammation** *follows.*

If the influence of the irritant be very *limited* and *transient*, a temporary stasis and functional and sensational disturbance only follows.

If it be *extended* and *continued*, or *repeated*, and yet of power enough to produce a *partial stasis only*, a condition may result to which the name of **chronic inflammation** has (improperly) been commonly given; of which more will be said hereafter.

The *effects*, or **symptoms**, of irritation differ according to the tissue or organ affected. When a nervous expansion or centre is involved, *pain* is the most familiar result. Functional disorder of the part innervated also occurs. Irritation of muscular tissue causes tonic *spasm.*

Inflammation must be considered, briefly, as to its *symptoms, minute phenomena, products, terminations* or *effects*, and *post-mortem* appearances.

Its recognized **symptoms** or signs, in a part open to inspection, are *redness, heat, swelling, and pain.*

In **internal** organs inflammation is detected chiefly by *pain, increased by pressure* or *motion; obstruction* or *alteration* of the *functional action* of the organ; and *general* (sympathetic) *vascular excitement.* Certain *physical signs* also aid in the diagnosis of inflammation of partic-

ular organs; these have been briefly alluded to already (see *Semeiology*).

The **minute phenomena** of inflammation, as seen under the microscope, have been variously construed by different observers. The use of the *term* itself has been, of late, distorted (Virchow) from its old meaning; and attempts have been made by some (Andral, Eisenmann, Bennett) to do away with it entirely; attempts which fail, because, in proposing other terms, a *part* only is substituted for the *whole*. It is curious, that, of the three terms proposed by three leading pathological writers, **hyperæmia, stasis,** and **exudation,** to take the place of the old word inflammation, *each* expresses a *single* part or element of the process, which *can only be defined by including them all.*

The essential minute phenomena of inflammation are, as regards the circulation,—

Central stasis;

Concentric hyperæmia;

Exudation.

Other changes, affecting the red and white corpuscles, etc., occur, but are of secondary consequence.

The *nature* and *cause* of these phenomena require, for their comprehension, a close consideration of the laws which govern nutrition, the capillary and arterial circulation, and innervation, in their mutual relations, under the influence of *normal stimuli* and of *morbid irritants.*

What are the actual causes of inflammation? (See the author's *Essay on the Arterial Circulation.*)

Not section of the nerves; nor division of the arteries (*per se*); nor division of the veins; nor ligation of arteries nor of veins; nor (*per se*) of lymphatics. Only such

causes as modify the **molecular state** of the tissue, and arrest, for the time, the usual interchange of material between the tissue and the blood, can induce a true inflammation.

Let us, then, revert to our maxims. *Ubi stimulus, ibi affluxus. Stimulation* causes *active hyperæmia. The arteries thus exhibit* **reflex action**; a fact which, in spite of the teachings of Unzer, Hunter, and C. Bell, has been denied or misunderstood by nearly every other physiologist and pathologist down to the present day.

Next, *ubi irritatio, ibi stasis.* Stimulation, carried to *morbid excess*, interrupts, by the molecular disturbance it induces, the *normal life-movement* of the part, and checks the interchange of particles going on between the capillaries and the tissue. Thus *the circulation in the capillaries of the part is arrested;* **stagnation** ensues.

Both of these results, active arterial hyperæmia and capillary stasis, follow from the *same* or *similar* causes acting in *different degree.* They may and do exist *together;* the one (capillary stasis) at the very **point** of irritation, the other (active hyperæmia) in the vessels **surrounding** it.

What follows? Hydraulics may answer this question. A quantity of fluid, in (minutely) porous vessels, being forced upon a centre whose condition allows little or none of it to be transmitted, an **effusion** must result,* through the more or less distended coats of the vessels.

This is expressed by our third maxim: *Ubi phlogosis*

* A quite different view of the inflammatory process is taken by the distinguished Virchow, of Berlin. But careful examination (*Essay on Irritation and Irritability; Cellular Pathology*, etc.) justifies the rejection of his *theory*, however great the value of many of his

(inflammation), *ibi effusio.* This phenomenon, the "**exudation,**" has attracted almost all the attention of many recent pathologists, to the exclusion of others which precede and accompany it; and with detrimental results (J. Hughes Bennett) as regards the practical and therapeutical deductions made therefrom.

An *example* of the three stages or processes of stimulation, irritation, and inflammation, may be very well studied in the action of a common *mustard plaster* applied to the skin. Its *first* effect (or the only one, if the mustard be *diluted*) is *stimulant* merely; the skin grows warmer, and redder, and its sensibility is moderately heightened. Next (if it be strong and allowed to remain), *irritation* is produced; shown by *pain, tenderness on pressure,* and a *deeper* and more *purple* redness. If the irritating matter be *now withdrawn,* all of these may subside without going further. But if the irritation be continued up to a certain point of duration and intensity, *inflammation* occurs. Then, we have redness, heat, pain, and swelling, with *effusion of lymph,* which, in the cutaneous inflammation caused by a sinapism or cantharidal plaster, *raises up the cuticle in the form of a blister.*

I would express, then, what I hold to be a correct theory of the nature of the inflammatory process, in the following definition: *Inflammation* is a **local lesion** of **nutrition,** *with concentric* **vascular excitement,** *resulting in* **exudation.**

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minute *observations.* It has been the misfortune of modern biology to be governed too much by the leadership of a few laborious observers,—notwithstanding the fact that they are far from being always comprehensive *reasoners.*

The **products** of inflammation (by exudation) are (see *Paget's Surgical Pathology*) 1. **Serum.** 2. **Blood.** 3. **Mucus.** 4. **Lymph.**

The inflammatory effusion of non-fibrinous **serum** is *rare*. The term is often applied, however, clinically, to a serosity which contains a small proportion of fibrin; as the effusion which follows pleurisy, etc.

Blood is exuded *occasionally* only; *e.g.* in dysentery, in nephritis, and (dissolved) in pneumonia.

Mucus, a certain portion of which constantly moistens the surface of mucous membranes in health, is altered both in character and in amount by inflammation. The general statement is, that when a mucous membrane is inflamed (*e.g.* in bronchitis), its secretion of mucus is *at first arrested,* then *increased,* and lastly *perverted* in character.

Coagulable **lymph** is, however, the characteristic ingredient of inflammatory exudations.

Inflammatory lymph is divided by Paget into—1, **fibrinous,** and 2, **corpuscular** lymph; with the assertion that, as a general fact, the more fibrin a specimen of lymph contains (provided it be *healthy* fibrin), the greater the probability of its being organized into tissue; while the larger its proportion of *corpuscles,* the greater is the likelihood of suppuration or some other degenerative process, and the more tardy its development into any kind of tissue. (Note an apparent *exception to this* in the case of *diphtheritic* exudation; explained by the fibrin of the latter *not being healthy.* See *Rokitansky's Pathological Anatomy.*)

Fibrinous (coagulable or plastic) lymph is very well seen in the autopsy of any case of acute pleurisy, peritonitis, arachnitis, etc.

It is a whitish or yellowish-gray substance, opaque or semitranslucent after coagulation, arranged in fibrous bands, meshes, or layers, and causing adhesions between contiguous portions of the tissues affected.

Corpuscular lymph may be studied in the fluid of the vesicles of herpes, or of an ordinary blister; especially if the surface of the latter have been exposed to the air for a short time.

The lymph- or exudation-**corpuscles** which it is found (under the microscope) to contain, are about $\frac{1}{2500}$ of an inch in diameter, "round or oval, pellucid, but appearing, as if through irregularities of surface, dimly nebulous or wrinkled." Examined after a few hours, under the action of water, a round and pellucid **nucleus** is observed within and attached to the cell-wall. It is, however, impossible, in a given instance, to make a *positive* microscopical diagnosis between these corpuscles of inflammatory lymph, and the normal lymph or chyle corpuscles, colorless corpuscles of the blood, and pus corpuscles.

The "biography" of the lymph of exudation consists in its **resorption,** or its **development** into connective, fibrous, elastic, osseous, cartilaginous, or vascular tissue, or into epithelium, etc. (rarely into muscular or nervous tissue); or its **degeneration** into *pus*, or *granule-cells, exudation granules*, etc.

The rapid **resorption** of a moderate amount of exuded lymph constitutes the **resolution** of an inflammation.

Its **development** is also a form of resolution, but with modification of the condition, dimensions, etc. of the part. This is, in some instances, merely restorative.

The **degeneration** of the exudation results in its being

thrown off, as pus, or *finally absorbed*, in the form of molecular exudation-granules.

Whether immediate absorption, development, or suppurative or granular degeneration shall occur in any particular case of inflammation, will depend—

1. On the *state* of the **blood**;
2. On the **seat** of the inflammation;
3. On the **degree** of inflammation.

(Paget's* experiments as to the influence of the state of the **blood** on the lymph of vesication.)

As to the **seat** of the attack, *generally, serous* and *synovial* tissues (pleural, peritoneal, arachnoid, articular) are most subject to *adhesive* inflammation, *i.e.* with the exudation of *fibrinous* lymph. *Mucous* tissues seldom exhibit this, being more prone to *suppurative* inflammation. (Exceptions in *croup, diphtheria*, etc.) *Parenchymatous* tissues, as those of the lungs, liver, etc., when inflamed, may suppurate, or the lymph exuded may degenerate into exudation granules, and be finally absorbed.

The **degree** of the inflammation exercises an important influence. The greater its intensity or severity (*i.e.* the more decided and extended the *local lesion of nutrition* and *concentric hyperæmia*), the farther will the lymph exuded be removed, in its primary character, from that transuded in the natural state of the part, and the more will its subsequent changes differ from those of normal nutrition and development.

Degeneration may affect both the *fibrinous* and the *corpuscular* portion of inflammatory lymph.

The **fibrinous** part is subject to—

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* Surgical Pathology, Phil. ed., p. 220.

1. Drying into *horny concretions* (as on the valves of the heart, from endocarditis).

2. *Fatty softening.*

3. *Liquefactive* degeneration.

Both of these last contribute, no doubt, to the process of **suppuration.** Calcareous and pigmental degeneration are also described as occurring occasionally, but they are less important.

The **corpuscular** portion of lymph may also undergo—

1. *Withering* and *drying* (as in scrofulous inflammation of glands).

2. Conversion into *granule-cells* (inflammatory globules of Gluge), by *fatty degeneration.*

3. *Calcareous,*

4. *Pigmental* degeneration.

5. *Most commonly,* degeneration of the lymph-cells into **pus-cells;** the whole of the lymph being transformed into **pus.**

Pus is a greenish-yellow, creamy fluid, consisting, under the microscope, of the *liquor puris* and *pus-cells* or corpuscles. The latter are definite cell forms, larger than blood or lymph corpuscles, somewhat more irregular, and often containing several nuclei. Their characters, however, are *not invariably distinctive;* as might be anticipated, from their being merely *transformed or degenerated* lymph or epithelial corpuscles; or, in a wound or ulcer, cells of granulation. Chemically, pus may be approximatively tested by its solubility in *liquor potassæ.*

Suppuration is either **circumscribed** (as in abscess), **diffusive** (in erysipelas), or **superficial** (in leucorrhœa, etc.)

The **effects** of inflammation *upon the part or organ involved* are—

Enlargement;	*Degeneration;*
Induration;	*Ulceration;*
Softening;	*Mortification.*

We thus see that very different or even *opposite* results may follow from different *degrees* or *kinds* of inflammatory action.

Specific inflammations require merely to be mentioned here. They are, chiefly, **scrofulous, erysipelatous, rheumatic, gouty, exanthematous, syphilitic,** and **gonorrhœal.** These are distinguished from ordinary inflammation and from each other in that—1, each exhibits a peculiar *plan* of morbid process; 2, each depends upon a peculiar *cause;* 3, the effects of the said cause are irrespective of its *quantity* or *extent* of *application;* 4, they are especially *diffusible* from one part of the body to another; 5, they sometimes exhibit definite *stages* of the morbid process (*e.g. primary* and *secondary* syphilis); 6, they are *nearly all,* in a more strict sense than other inflammations, *self-limited;* the morbid process *dying out* after a certain time. (This *last* statement applies especially, if not only, to *exanthematous, rheumatic, gouty,* and *gonorrhœal* inflammations; hardly to the scrofulous, erysipelatous, and syphilitic).

The **post-mortem appearances** of inflammation are important. They can be *generalized,* so as to avoid, to a great extent, the necessity of their reiteration in connection with the description of particular diseases. It is, at the same time, necessary for the student to *familiarize* himself

with them, in their local manifestations, by availing himself of every opportunity for autopsic study.

A part which has been inflamed will exhibit after death some, or perhaps all, of the following signs:—

Redness;	Coagulable lymph;
Enlargement of	Pus;
blood-vessels;	Softening;
Tumefaction;	Induration.

The **redness** of inflammation must be distinguished with care from—1, *hypostatic* injection, or cadaveric settling of blood in the lowest parts, by gravitation; and 2, *physiological* redness, as of the stomach during digestion, the ovaries during menstruation, etc. Inflammatory redness is usually more *unequal* than either of the above, and is *stellated*, or in *streaks* and *patches*.

Enlargement *of the* **blood-vessels** of a part may occur as the result of a *chronic* affection, different from acute inflammation. This sign, therefore, is to be interpreted with great caution. The same is true of *tumefaction*.

Softening, if not *cadaveric* (as when the body has been long defunct), may have been produced by *chemical action*, as in poisoning by corrosive sublimate, etc., by *acute and rapid inflammation*, or by *slow, non-inflammatory degeneration*.

Induration may also follow either acute inflammation or slow, atrophic degeneration.

The presence of bands or membranes of coagulable **lymph** is indisputable evidence of inflammation having occurred in the part. But it is not easy, in *all* cases, to determine with certainty whether such formations are *old* or *new*.

The existence of **pus** is a still stronger sign of the recent existence of inflammation; but, occasionally, instances occur in which pus, produced by inflammation in *one* part, is conveyed (as in phlebitis) by the veins, etc., and *deposited in another*. This, although a rare event, is *possible* at least.

Clearly, therefore, *no one* of the above post-mortem signs of inflammation is sufficient *alone*. *Several of them together* will make the diagnosis certain. *Redness* and *enlargement of blood-vessels*, with *lymph* or *pus*, and softening or slight induration of tissue, will leave little or no doubt in any case.

The variations in the appearance of different organs and portions of the body, in fatal cases of inflammatory disease, are not such as to interfere with the correctness and availability of this general description.

The term "**chronic inflammation**," *as commonly* applied, is a *misnomer*. Although the cases so designated exhibit more or less redness, heat, swelling, and pain, yet they are wanting in *exudation;* without which, pathologically, there is *no inflammation*. There is also, in the same cases, only a *partial stasis* or *none;* and the *hyperæmia* is less intense and less strictly concentric than in acute inflammation.

The characteristics of this state, for which a new term is wanted, are—

1. **Enlargement** of the **blood-vessels** of a part (chronic hyperæmia), with the flow of a large amount of blood **through** it.

2. Exaggeration of the **sensibility** of the part (*hyperæsthesia*) and morbid **irritability**.

3. **Deficient** or irregular *functional* **power.**

4. Unusual **proneness** to acute or subacute *attacks* of **actual inflammation.**

For this familiar combination of pathological elements I propose the name **hyperæmæsthesia.**

It has, lately, been usual to designate it by the term "**irritable,**" in connection with the name of the particular part affected; thus—

Irritable uterus;

Spinal irritation;

to which I would add—

Irritable eye (chronic ophthalmia);

Irritable stomach (chronic gastritis);

Irritable brain, etc.

Degeneration has already been defined as **qualitative atrophy**; *i.e.* a substitution, under decline of the organic force incessantly active in nutrition and repair, of *abnormal* for *normal* structure and material.

The forms under which this occurs are—

Fatty degeneration;

Calcification;

Pigmental degeneration;

Thickening of primary membranes;

Fibroid degeneration;*

Liquefactive and corpuscular degeneration.

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* *Amyloid* degeneration has also been described by Virchow and others, as occurring in the brain, spleen, liver, etc. It consists in the conversion of tissue into a substance having physical and chemical properties resembling those of starch or cellulose.

In regard to all of these, except the last, it may be stated (see *Paget's Surgical Pathology*) that

1. They are changes such as may be observed **naturally occurring,** in one or more parts of the body, at the **approach** of the natural **termination** of **life.**

2. The new material is of **lower chemical composition** than that normal to the part; *i.e.* it is less removed from the inorganic state: as fat, gelatin, calcareous matter, etc.

3. In **structure,** it is **less developed;** being crystalline, granular, simply globular, etc.

4. In **function,** it is **less powerful.**

5. In **nutrition,** it is **less active** and capacious.

6. *Generally,* although *not always,* **constitutional** debilitation *precedes,* and (we may infer) institutes the local alteration of structure.

7. *Inflammation* or other *local* **disease** may, by *impairing* the *nutrition* of a part, **cause** it to degenerate.

The form of degenerative disease which has received the most attention from pathologists is **fatty degeneration.** This has been carefully studied, as it occurs in the heart, arteries, brain, muscles, bones, liver, kidneys, and morbid products. It must be distinguished carefully from mere fatty *accumulation* or adiposity.

Our knowledge of the facts concerning degenerative disease, and of the share which it claims in the domain of structural pathology, once almost entirely usurped by inflammation, is among the most important of the acquisitions of the medical science of the last quarter of a century.

Tumors, and **morbid growths,** benign and malignant, which may be best classified as forms of structural degeneration, or vitiated nutrition, I leave,—except some brief cor-

sideration, now, of the pathology of cancer,—as more appropriate to the department of Surgery.

Cancer falls under the notice and care of the medical practitioner, when it attacks parts or organs within any of the great cavities of the body.

There is no essential impropriety in classing, pathologically, *all* **malignant** growths* together as cancerous; their *subdivisions* being clinical or surgical. (By *malignant*, we mean, prone to unlimited increase; disastrous in effect or result; and difficult or impossible of arrest or cure).

Cancers may, then, be divided simply into

Schirrus, or hard cancer (fibro-carcinoma);
Colloid, or gelatiniform (alveolar) cancer;
Encephaloid, or brain-like (medullary) cancer.

Each of these contains, as its anatomical elements, **fibres, fluid,** or semi-fluid jelly, and **cells.**

Schirrus is composed mainly of a fibrous or filamentous tissue, with little fluid, and comparatively few cells.

Colloid cancer has a variable amount of fibrous tissue, arrayed as a *matrix* (compared often to the structure of an orange), containing a *jelly-like* substance; cells may be also found in it, but in less proportion.

Encephaloid cancer is (so to speak) the *highest development* of carcinomatous formation. It consists of a fibrous **matrix,** containing an abundance of abnormal, multiform cells, and a peculiar fluid.

When a cancer, of either type originally, is based upon

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* Tubercle, it will be remembered, is not a *growth*, but an *abortion* of tissue.

and includes bony structure, it constitutes *osteo-sarcoma*. If it develop itself upon the skin, or other epithelial tissue, or, wherever occurring, display similar structure, it may be called *epithelioma*. If its location involve especial *vascularity* and hemorrhage, it assumes the form and name of *fungus hæmatodes*. The *pain* of cancer (which is not always present) appears to depend upon the extension of the disease to a tissue well endowed with nerves.

The cells, fibres and fluid* of cancer are all *abnormal*.

But, are these forms *heterologous; i.e.* different from anything normal or natural to the body? Are they, so to speak, *implantations*, or **distortions**? I believe, fully, that the latter is the correct view. The "cancer-cells" are no longer held by micrologists to be pathognomonically distinctive; they are **homologous** with other cells found in the body. Yet, they are such forms as *do not normally belong to the part;* being produced by morbid alteration or perversion of its natural elements.

The most rational theory of cancer, then, is *dynamic*. The disease consists in a morbid **tendency**; a tendency to enormous and unhealthy growth of a formation which is, at the same time, vascular and sensitive, showing subserviency, although under *perversion*, to the physiological laws of the organization.

The origin of cancer, in **most**, if not in all cases, is **constitutional**; it is not unfrequently *hereditary*.

Genuine cancer may always be expected to return after removal—although exceptions occur, and it has occasionally been known to undergo spontaneous degeneration.

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* The milky or creamy "cancer-juice," which emulsifies with water, is considered highly characteristic by many observers.

The order of choice which cancer exhibits, as to the parts it attacks, is (Rokitansky) as follows :—

Uterus;	Skin;
Mamma;	Brain;
Stomach;	Eye;
Rectum;	Testicle;
Lymph-glands;	Ovary;
Liver;	Tongue;
Bones;	Œsophagus.

Colloid cancer, in particular, prefers the

Stomach, rectum, peritoneum.

Schirrus, the

Mamma, stomach, intestines.

Encephaloid may occur in any organ; it *alone* attacks the

Liver, kidney, lung, testicle, eye, lymph-glands.

The pathology of the **nervous system** (neuropathology) is, itself, an extensive field, of which the merest *coup d'œuil* is possible here.

For the purposes of pathological study, we must remember that the *anatomical* elements of the nervous apparatus are—1, gray, vesicular; and 2, white, tubular nervous substance; the former being arranged in *ganglia*, the latter in *nerves* and *commissures*.

Physiologically, the functions of the *ganglia* (nerve-*centres*, and, probably, impressible *peripheral* ganglionic *expansions* also) are, to *receive*, *reflect*, *accumulate*, (generate ?) and *distribute* nerve-force. The sole function of *nerves* and *commissures* is, to *transmit* or *conduct* it.

As a whole, we may state the offices of the nervous apparatus to be as follows:—

Excito-motor;
Excito-secretory;
Sensory;
Voluntary motor;
Internuncial, *i.e.*
  Sympathetic and
  Synurgic (co-ordinative);
Psychical, *i.e.*
  Intellectual;
  Emotional.

The primary disorders to which this apparatus is liable, are (see *Simon's Lectures on Pathology*),—

1. **Anæsthesia**; *i.e.* that condition in which the patient remains without cognizance of impressions made on a surface which is normally sentient. This may result, *a*, from disease of the nervous expansion at the **surface**; *b*, from disease or injury of the **conducting nerve**, somewhere on its track; *c*, from disease of the **cerebral sub-centre** of sensation (sensorium). The *thalami* (miscalled *optic*) are believed by physiologists generally to be the *aggregative* centres of sensation; and local lesion (apoplectic clots, tumors, softening, etc.) in or near them is frequently associated with hemiplegia, etc. The paralysis is commonly observed (from *decussation* of the nerve fibres in the medulla oblongata) on the side *opposite* to that on which the lesion has occurred.

2. **Subjective** impressions and sensations; *i.e.* those which affect the consciousness of the individual *without the action of any external or peripheral cause.* These sub-

jective impressions may be divided into—*a*, those which are **central** in their origin, as when disease of the optic thalamus causes neuralgia of the fifth pair of nerves; and *b*, those whose origin is **intermediate**; as, when inflammation of the *sheath* of a nerve, or disease of the *spinal axis*, gives rise to pain referred by the patient to the *termination* of the nerve.

Subjective **hyperæsthesia**, or perversion of sensibility or psychical impressibility, may be, in its causation (as regards the nervous apparatus), either **functional*** or **organic**; and the difference between these is often practically important.

3. **Muscular paralysis**; or that condition in which a central volition (or the excitation equivalent to it) fails to produce its normal effect of muscular contraction. Of this defect, also, the pathological origin may be, as to its seat, either **peripheral, intermediate, sub-central** (in the corpora striata or cerebellum), or **central** (in the convolutions of the cerebrum). Muscular as well as sensational paralysis, dependent on an affection of the brain, occurs on the *opposite side* to that of the encephalic lesion. **Hemiplegia** and **paraplegia** have already been defined (see *Semeiology*). Scarcely ever are either of these varieties of palsy confined *exclusively* to sensation or to voluntary motion—although the *proportion* of impairment of the two functions may vary considerably in particular cases.

4. Involuntary contraction of voluntary muscles, or **convulsion.** Only very *local*, and usually *transitory* spasmodic affections are *peripheral* in their origin. Usually, convul-

* *Functional* nervous disorder results generally (Todd) from an abnormal state of the *blood.*

sive affections are accounted for by excessive functional excitement of the (spinal) **motor centres**; the causation of which is made up of three elements, in variable proportion, viz.: *a*, morbid **irritability** of the **spinal** *excito-motor apparatus itself; b*, imperfect *control* over the *subordinate nervous centres* by the **brain**, from an abnormal condition of the latter; *c*, the disturbing influence of a **peripheral irritant**—as, the tension of the gums in teething, worms in the bowels, undigested food in the stomach, etc.

The three forms of spasmodic disturbance to which the muscles are liable under a morbid alteration of innervation, viz.: the **tonic, choreic,** and **clonic,** are illustrated respectively in **tetanus, chorea,** and **epilepsy.**

A farther important pathological subdivision exists as to the method of **origination** of those functional disturbances of the nervous system to which we have been alluding.

The source of any of the above forms of nervous disorder, hyperæsthesia, anæsthesia, muscular paralysis, or convulsion, may be (when not purely local) either

1. Central **organic** disease;
2. Blood-perversion, or defective **nutrition**;
3. Purely **sympathetic** disturbance.

It is far from easy, in many cases, to mark the diagnosis between these different modes of causation of nervous symptoms; but, when the decision has been made, in any instance, the *prognosis* is *most* favorable in the *last* case; less so in the *second;* and most unfavorable in the *first, i.e.* when the symptoms have their origin in an actual organic lesion of an important nerve-centre.

PART IV.

NOSOLOGY.

DISEASES were by Cullen classified as **locales** (*phlegmasiæ*), **pyroses, cachexiæ,** and **neuroses** (local inflammations, fevers, cachectic diseases, and nervous affections).

The advances made in pathology since Cullen's time require some *modification* of this arrangement, while retaining its principle. I propose, therefore, that diseases be subdivided as—

Phlegmasiæ: inflammations.
Zymoses:* zymotic diseases.
Cachexiæ: cachectic affections.
Neuroses: nervous disorders.
Ataxiæ: *unclassifiable* diseases.

The following list is intended to present only the *most important* diseases of each class.

Phlegmasiæ:

Laryngitis;	Pericarditis;
Tracheitis;	Stomatitis;
Bronchitis;	Pharyngitis;
Pneumonia;	Gastritis;
Pleurisy;	Enteritis;
Endocarditis;	Dysentery;

* From ζυμοω, to ferment.

Peritonitis;	Meningitis;
Hepatitis;	Cerebritis.
Nephritis;	Myelitis.

Zymoses (diseases produced by a *morbid poison introduced from without*):

Not usually included as zymotic diseases—

1. Syphilis;
2. Gonorrhœa;
3. Hydrophobia.

} Contagious.

Eruptive—contagious—

1. Variola;
2. Varioloid;
3. Vaccinia;
4. Varicella;
5. Scarlatina;
6. Rubeola.

} Occurring usually but *once*.

Contagious—not eruptive—

1. Parotitis contagiosa (mumps);
2. Pertussis.

Generally epidemic or endemic—

1. Typhoid fever (?);*
2. Typhus;
3. Puerperal fever;
4. Erysipelas;
5. Plague;
6. Cholera;

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* The *question* here is intended to apply to the mode of *causation* of typhoid fever; not to its existence or distinction from typhus.

7. Epidemic dysentery;
8. Influenza;
9. Diphtheria.

Endemic—

1. Yellow fever;
2. Dengue.

"Miasmatic;" endemic—

3. Intermittent;
   Remittent;
   Pernicious fever.

Cachexiæ:

1. **Diatheses** (general cachexiæ):

   Always chronic—

   a. Spanæmia (anæmia);
   b. Chlorosis;
   c. Leucocythæmia;*
   d. General dropsy;
   e. Hemorrhagic diathesis;
   f. Tuberculosis;
   g. Diabetes;
   h. Lithiasis.

   Acute or subacute—

   a. Scurvy;
   b. Gout;
   c. Rheumatism;
   d. Ichoræmia (pyæmia).

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* Literally, *white-cell-blood; i.e.* excess of colorless corpuscles in the blood.

2. **Local** cachexiæ (degenerations):

Cancer;
Various tumors, cysts, etc.;
Goitre;
Cirrhosis (of the liver);
Bright's disease (of the kidney);
Addison's disease (of the supra-renal capsules, etc.);
Other organic degenerations.

Skin diseases; viz.—

Exanthemata (erythema, urticaria, roseola);
Papulæ (lichen, etc.);
Vesiculæ (eczema, etc.);
Bullæ (pemphigus, etc.);
Pustulæ (impetigo, etc.);
Squamæ (psoriasis, etc.);
Maculæ (fuscedo, etc.);
Hypertrophiæ (elephantiasis, etc.);
Tubercula (molluscum, etc.);
Parasitici (scabies, etc.);
Hæmorrhagiæ (purpura);
Syphilida.

Neuroses:

Apoplexy;
Paralysis;
Epilepsy;
Catalepsy;
Hysteria;
Chorea;
Tetanus;
Neuralgia;
Delirium tremens;
Insanity; viz.—
Acute mania;
Chronic mania;
Monomania;
Dementia.

Ataxiæ (unclassifiable diseases):

Hemorrhages;	Jaundice;
Local dropsies (ascites, etc.);	Cholera morbus;
Asthma;	Colic;
Angina pectoris;	Diarrhœa;
Dyspepsia;	Worms.

PART V.

GENERAL THERAPEUTICS.

REMEDIES have been classified, for the study of *Materia Medica*, in a manner (see *Wood's Therapeutics and Pharmacology*) which is perfectly well adapted to the present state of that science.

I propose the following classification, from the standpoint of the *practitioner; i.e.* according to the **indications** of **treatment,** or *objects proposed.*

Thus regarded, remedies may be studied as—

Anodyne and **calmative**: *e.g.* opium; ether; chloroform.

Protective: *e.g.* demulcents; surgical dressings.

Balancive: *e.g.* cold to an over-vascular part; pediluvia; blood-letting.

Eliminative: *e.g.* colchicum in gout; purgatives; iodide of potassium, etc.

Antidotive: *e.g.* hydr. ox. of iron for arsenical poisoning; antacids; quininization in intermittent.

Alterative: *e.g.* nitrate of silver in scarlatinal sore throat; arsenic in skin diseases.

Economic: rest; astringents; retarders of tissue-metamorphosis.

Recuperative: stimulants; tonics; chalybeates; oleum aselli; travelling.

An elaborate work might, of course, be written upon the topics included in this table. It is appropriate to our purpose, only to state them; and to dwell, for a few moments, upon another yet more brief classification, of the *modes of treatment most frequently called for*, in the management especially of acute and subacute affections.

These may be designated as—

The **antiphlogistic**;
The **febrifuge**;
The **supporting**;
The **antidotive**;
The **alterative** treatment.

Under the first head, the **antiphlogistic** (*i.e.* the treatment of *inflammation*), we place—

Rest;—position;	Ipecacuanha;
Cold applications;	Veratrum viride;
Venesection;	Aconite;
Local depletion;	Digitalis;
Purgation;	Ergot;
Diet;	Mercury;
Tartar emetic;	Opium;
Nitrate of potassa;	Counter-irritation.

The necessity of **rest** during *active inflammation* of any organ is a rule without exception.

A choice of **position** is often dictated by the sensations of the patient. When one of the *extremities* is inflamed its *elevation* is advised, in order to allow the blood to return from the overloaded vessels.

Cold applications are very important in the treatment not only of *inflammation*, but of *active hyperæmia* or congestion (*e.g.* "determination of blood" to the head).

The two precautions most necessary in their use are, that the cold be not *excessive*, and that it be not *ill timed*, so as to arrest desirable *perspiration*.

Blood-letting, by *venesection*, *leeching*, and *cupping*, is one of the oldest, and has been one of the most universal of remedies for inflammation. Although "*ἀιμοφωβοι*," or "blood-fearers," have occasionally appeared in all ages and nations, yet the aggregate testimony of the profession, from Hippocrates down to the present time, has been in favor of the use of the lancet and of local blood-letting in the treatment of violent inflammations and congestions.

Now, however, it must be admitted that blood-letting has more opponents and fewer defenders than at any previous period in medical history. Why is this? By reason of—

1. *Reaction* from previously existing *abuse* of the remedy.

2. A *change in the average human constitution*, occurring under the artificial habits of *civilized life*.

3. *False construction and misapplication of recent science*.

4. *Leadership* and *fashion*.

I must briefly remark, that the *reaction* alluded to has proceeded *too far*, going from one *extreme* to another.

The *change* occurring *especially in large cities*, in the average human constitution, affords good reason for *limiting* the use of the lancet to a smaller number of cases than was once thought necessary; and for using especial caution as to the *amount of blood abstracted;* but not for abandoning the remedy altogether.

The improved condition of the sciences of *semeiology* and *pathology* gives us the power to discriminate more nar-

rowly in our use of blood-letting, as well as of other remedies. But, we should not, for this, throw aside as useless all the experience of our predecessors; as if every new fact was necessarily the heir of some dead old one. *All* facts, old and new, should be retained.

In the *physiological* and *pathological* science which bears upon the question, I hold that false construction and misapplication of observed facts have been operative. An important threefold error has been committed; viz.—

1. In physiology, the denial or depreciation of the *active* part taken by the *arteries* in the circulation; and of the great fact, without recognition of which no theory of inflammation can stand, that the arteries are subject to *reflex* excitement,—the most normal form of which constitutes active hyperæmia, the most abnormal and exceptional, tonic constriction of the vessels.

2. The error of Prof. J. H. Bennett, of giving attention, in regard to the pathology of the inflammatory process, to the *exudation* alone.

3. That of Prof. Virchow, in considering that no important difference in *kind* exists between morbid lesions of nutrition in vascular and in non-vascular tissues; and that *stimulation*, *irritation*, and *inflammation* are, *essentially* and *practically*, as well as causatively, only degrees of the same vital impression.

The theory of inflammation which has been already laid down,* as entirely consistent with the *observations* (whatever may have been the reasonings) of the most accurate pathologists (*e.g.* Rokitansky, Paget, Wharton Jones),

* See *General Pathology*, Part III.

inculcates, that the determination of blood toward an inflamed part *conspires with* the central stasis in *causing* the exudation; and that a constant *proportion* exists between the *degree* of this active turgescence and the *amount* of the exudation, and the *character of the changes* which it subsequently undergoes.

Now, of the cardinal elements of the inflammatory process, the local *arrest of nutrition* and *capillary stasis* cannot be *directly* affected by treatment. Nor, *when the exudation has occurred*, can any but palliative or expectant measures be applied to the management of its changes. But, the active concentric determination of blood—the *arterial excitement*—cannot *this* be essentially *modified* by *treatment*? Yes.

By abstraction of blood, we lessen (for a time at least)—

1. The **fullness** of the vessels;
2. The number of **red corpuscles**;
3. The force of the **heart's** impulse;
4. The force of the **arterial** impulse;
5. The excitement of nerve-centres.

And by each and all of these influences, we diminish the vascular excitement connected with an inflammation; and thus (I repeat) *lessen the amount* of the resultant exudation, and (Paget) render its "biography" more normal, its changes less degenerative and destructive.*

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* It may be hoped that the time has gone by when any question in therapeutics can be decided by *leadership*. But the "blood-letting controversy" has shown, that the medical mind is not yet *absolutely* free from its influence. As to authorities, old and new, it may interest the student to remember, that, of ancient opponents to the

If this be true, it is altogether an erroneous assumption, of Professor Bennett, and others, that inflammation is a "self-limited process which cannot be cut short nor interfered with to advantage." If there be anything positive in medical experience, I believe the contrary of this to have been established.

Thus much, perhaps, must be allowed to the influence of recent ratiocinations and experimentations in medical practice without the lancet; that *local* blood-letting may be

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lancet, Chrysippus and Erasistratus were the most noted; of the modern European schools, Van Helmont, Dietl, and Skoda, in Germany; Grisolle, in France; Bennett and Todd, in Great Britain. Exemplification of Sangrado's practice, on the contrary, has been especially accredited to Cullen in England, Rasori in Italy, Chomel and Bouillaud in France, and Rush (the father of American medicine) in this country. We should place in the class of *moderate* bleeders, of antiquity, Hippocrates, Celsus, Galen, Avicenna, and "ὅτι πολλοι;" of earlier English and French teachers, Sydenham, Huxham, Gregory, Laennec, etc.; of the present date, the recently deceased Professor Alison, with Watson, Christison, Chambers, Parkes, and others in Great Britain; Wunderlich in Germany; and, in this country, as a representative of American medical conservatism, Professor Wood. As *statistics* have been especially appealed to by the opponents of blood-letting, it may be proper to quote here the conclusion of an able analysis of all the evidence of this kind made public (*Brit. and For. Medico-Chirurg. Rev.*, July, 1858). It is as follows:—

"While the non-bleeding plan has a demonstrable advantage over that of indiscriminate and repeated bleedings, we maintain that the discriminating practice of moderate and early bleeding, general or local, in cases of more or less sthenic inflammation, and of refraining from it altogether in asthenic cases, whether as regards the character of the disease or the constitution of the patient, is *pressed upon us both by experience and science.*"

admitted, in almost every case, to have all the advantages which can be claimed for venesection, except *convenience;* and that, in doubtful cases, the smaller quantity abstracted ought always to be an argument in favor of local rather than general depletion. This admission may be made without surrendering, in the least degree, the principle of therapeutics upon which blood-letting is scientifically justified, and according to which, if we are to interfere at all with disease, it is often one of the mildest, most beneficent, and least hazardous of remedies.

How, then, it is proper to ask, do we *define* or *classify* the remedial action of blood-letting?

It is **balancive.** What do we mean by *reducing treatment?* The answer to this question is important.

I do not know of a single case of any kind of disease, in which the indication or object of medical treatment is to reduce the strength, or lower the vital power of the patient's system.

What we aim to **reduce** is, *disproportionate vascular* **excitement,** *or* **congestion;** to restore the **balance** of the circulation. It is a mere *imagination* that abstraction of a small quantity of blood *must always* lower the patient's strength. Under some circumstances, it actually increases it. At the same time, there are many persons who *will never bear* bleeding, from an actual *deficiency* of blood.

Taking these propositions as established, we may draw blood, locally or generally, for

1. High, **sthenic** inflammation;
2. *Active* **congestion, threatening** inflammation or hemorrhage;
3. *General* **plethora,** ditto;

4. *Sthenic* spasm;
5. *Sudden passive congestion* (not toxæmic) in robust persons.

It must be remembered that, at the present time, *no one* thinks of bleeding *for fever, as such.*

Repeated venesections are seldom now resorted to; the *time* for the lancet, if at all, is always in the early stage of a phlegmasia.

It would be instructive, if compatible with our plan, to allude farther, especially, to the use of blood-letting in *certain cases* of *pregnancy*, and of *convulsions;* and to the *caution* necessary in its application to the treatment of *senile apoplexy.* We might illustrate, also, the principles above laid down, by the examples of—1, *erysipelas;* 2, *pneumonia;* and 3, *meningitis;* giving *reasons* why bleeding is *seldom* called for in the first, *more frequently* in the second, and still more often in the last.

As to the quantity of blood taken by venesection, f℥xij may be stated as a *full*, though *not large*, bleeding for an adult man; f℥x for a woman. For infants and children, one ounce under one year, two ounces under three years, three ounces under five years, four ounces under ten years, would be a full average. The practitioner should judge for himself of the *effect* upon the pulse, etc.

Cut cups and leeches both act alike as to the abstraction of blood; but the former have a more *revulsive* or *counter-irritant* effect.

Leeching, being somewhat less violent, is more applicable than cupping to parts which are very *tender;* as, the side in acute pleurisy; the abdomen in peritonitis; a much inflamed joint, etc.

Leeches are usually, for the same reason, applied as near as possible to the part inflamed; cups, sometimes, at a short distance from it.

In *bronchitis*, it is ordinarily best to apply leeches or cups to the upper *sternal* region.

In *pneumonia*, they may be preferably applied *between the shoulders*, as a general rule, thus leaving room for counter-irritation in front.

In pleurisy, it is desirable to use *leeches* immediately over the inflamed part.

Purgation, especially by *saline* cathartics, is a frequently useful part of antiphlogistic treatment.

Cathartics are to be **avoided** in **enteritis** and **peritonitis**; for obvious reasons.

Diet, in cases of **sthenic** inflammation, should be *non-stimulant;* but it may be sufficiently *nourishing* (vegetable, farinaceous) at the same time. *Starving* patients is not now thought of, unless they are fearfully *plethoric*. In the **later** *stages* of inflammatory disorders—in fact, *as soon as the exudation has all been thrown out*, **generous** diet is usually required. Some patients will never bear a purely vegetable diet under any circumstances; and *some* cases, even of inflammation, require stimulation from the first.

The most powerful of antiphlogistic (arterial sedative) **medicines** is **tartar emetic.**

The "contro-stimulant" plan, of giving *very large* doses of this drug in pneumonia, pleurisy, etc., has been abandoned as excessive and injurious. We need never give more than $\frac{1}{8}$ of a grain of tartar emetic at a dose to an adult—oftener $\frac{1}{8}$, $\frac{1}{12}$, etc. *Children* require *especial* caution in its use, on account of the sensitiveness of their ali-

mentary canal. I have known severe vomiting to be induced in an infant by $\frac{1}{64}$ of a grain. No other medicine as yet discovered, however, is so useful in violent inflammations of the pleura, lungs, bronchial tubes, etc.

Tartar emetic (of course) must **never** be given in **gastritis** or **enteritis.**

Nitrate of potassa is a very valuable adjunct to, or in some cases substitute for, the antimonial tartrate. It is often given in *too small* doses; ten grains may be a minimum for an adult, if the stomach is in an ordinary state.

Ipecacuanha is especially valuable in *bronchial, tracheal,* and *laryngeal* inflammations, and in *dysentery.*

Veratrum viride is, lately, assuming an important place as a cardiac and arterial sedative, and promoter of the secretions.

Aconite is, likewise, a favorite medicine with some practitioners, in the management of pleurisy, pneumonia, etc.

The power **digitalis** possesses, to reduce the action of the heart, has induced the expectation that it would prove a reliable antiphlogistic remedy; but this expectation has been *disappointed.* It is, however, occasionally useful in bronchitis, etc.

Ergot has been employed with the same view, rather as a direct sedative to the *smaller arteries.* It is quite possible that its powers have not as yet been sufficiently tested.

The place of **mercury** had appeared, until within a few years, to be settled. Twenty-five years ago, nothing was more common than intentional mercurial *salivation* in the treatment of almost all violent acute and even chronic diseases. In the management of inflammation, in addition to its powerful *alterative* influence, tending to displace, by it-

own impression, morbid actions and conditions, it was *believed* to exert a peculiar control over the *blood, lessening the tendency to the effusion of coagulable lymph.*

In recent times, the "salivating" practice has been almost entirely abandoned, as disproportionately violent, as well as uncertain. A reaction, somewhat similar to that occurring in the case of blood-letting, has even shaken the confidence of many practitioners in the value of mercury as an antiphlogistic.

My own opinion, very decidedly, is this. That experience fully warrants the inference that mercury is *a general stimulant to all those functions of organic life which are performed under innervation from the ganglia of the* (so-called) *sympathetic* system. It is probable that its action is directly *upon* these ganglia. Thus, mercury tends to *diffuse* and *equalize* secretion,* and the circulation of the blood, aiding, in this way, to break up local congestions and inflammations.

I believe that calomel and blue mass, etc. *have been shown* to be useful in the treatment of several of the acute phlegmasiæ. I do not think that a due regard for the principles of evidence in *therapeutical science* can allow us to put aside the proof of this, deduced from actual experience.

Moderate doses, at the same time, are capable of doing all that we can *safely* aim to effect with the use of mercurials. I do not know of any variety or form of disease in

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* Very few points in practice are, for instance, so well sustained by experience, as the familiar use of small doses of *blue pill,* in the treatment of indigestion with torpor of the liver and bowels, etc.

which I should, at the present moment, feel justified in *intentionally* causing *full salivation* as a means of medical treatment.

Mercury is especially *contra-indicated* in the presence of the *tubercular diathesis.*

Opium, always the most reliable and potent of *anodyne* medicines, has, in latter times, assumed a more important position as a *remedy* in the treatment of inflammatory diseases.

Experience has warranted this, while certain theoretical considerations have also been urged in regard to it.

1. The influence of the *nervous centres* upon *inflammation* (as upon normal nutrition, circulation, etc.), and the intimate *interconnection* of the two portions, vegetative and sensori-motor, of the nervous apparatus, are now more fully recognized than formerly.

2. Opium (morphia) is believed by some to act *directly, not only* upon the cerebro-spinal, but also upon the *ganglionic* nerve-*cells,* as a peculiar stimulant, thus affecting the circulation, nutrition, etc., otherwise than by mere sympathy.

Yet, in estimating the adaptation of preparations of morphia or opium to the treatment of inflammations of important organs, in different stages, we must remember, that

Opium is an *arterial stimulant,* and is, therefore (as a *general rule*), inappropriate in the *early stage* of an active sthenic phlegmasia.

Opium *first excites,* and then *oppresses* the *brain;* in a word, promotes determination of blood to the head, and is, therefore, contra-indicated by an already existing tendency to *cerebral congestion.*

Opium also *constipates the bowels*—a fact of less importance than either of the two preceding, as the constipating tendency can be counteracted, if desirable, by other medicines; while, in certain cases, it aids in the treatment (as in dysentery).

In *peritonitis*, where the extent and visceral connections of the tissue affected induce more rapid *prostration*, and more serious *nervous irritation* than in any other phlegmasia, *opium has become the* **main dependence** with very many practitioners, even from the *beginning* of the attack. The same reasoning will apply, to a somewhat less extent, to its use in *severe* cases of *pleurisy* and *pericarditis*.

Counter-irritation is a measure of treatment often of great service, especially in the *later* stages of inflammation (after local or general depletion, etc.), or in cases unattended with much vascular excitement. In the very *incipiency*, or rather *incubation*, of an inflammatory attack, *i.e.* in the stage of mere *irritation* or *congestion*, counter-irritation (*e.g.* by a *sinapism*) may *prevent* the further progress of the inflammatory process. But, if the stasis and concentric hyperæmia be already developed, all *powerful* counter-irritants should be avoided (lest they prove *co*-irritants) until the vascular disturbance has subsided.

Counter-irritation is, usually, the *most important* part of the treatment of **hyperæmæsthesia**, or "chronic inflammation."

To recapitulate the **order** of time, in which long recognized experience has prescribed the use of the different means now included under the term "antiphlogistic" treatment:—

Supposing all* of the main remedies of this class to be called for in a given case, we would resort *first* to *venesection;* or, if this be undesirable, to *cupping* or *leeching;* next, to *saline purgation;* then, to tartar emetic, nitrate of potassa, ipecacuanha, veratrum viride or aconite; mercury at the same time, or immediately following these sedatives; opium sometimes with it or them,—oftener, a little later; counter-irritation by blisters, etc., last. The *subsequent debility*, especially in cases of *suppurative* inflammation, may call for *tonics* or even stimulants, with generous diet, etc.; while certain cases will even require such treatment from the *first.*

The treatment of *subacute* or *chronic* inflammation, in external or accessible parts, by *astringents* or *stimulants* (e.g., *nitrate of silver*), does not require, in this place, extended discussion; as it usually comes under the domain of Surgery. One example, however, of its *medical* utility, may be named—viz., the administration of nitrate of silver (gr. $\frac{1}{4}$—$\frac{3}{4}$ *ter die*) in *chronic gastritis.* The change which it undergoes in the intestines, when given by the mouth, explains the fact that the same medicine fails to exhibit a similar beneficial influence in chronic *enteritis.* In prolonged *dysentery*, however, *enemata* containing this or some analogous mineral salt, as sulphate of zinc, sulphate of copper, or acetate of lead, are often very valuable remedies.

We cannot leave the subject of the management of inflammatory disease without reminding the student of the im-

* Of course, this supposition, of the successive use of all of the remedies named in this paragraph, does not, in very many cases need to be realized.

portant practical difference between **sthenic** and **asthenic** inflammations.*

This difference is constituted—

1. By the *state of* **system** of the patient affected;
2. By the nature of the *producing* **cause.**

One whose constitution has been prostrated by previous disease, or recent excess, will have, when exposed to the ordinary causes of inflammation, an *asthenic* attack; *i.e.* one in which, with all the local symptoms of phlogosis, *the general organic functions are sympathetically affected rather with* **depression** *than with excitement.*

Again, certain **morbid poisons** induce, with toxæmia, local inflammation; and blood-disease (dyscrasia), arising from various causes, may have local inflammation as a *secondary effect.* In these cases the type of the inflammation is generally *asthenic*, and the *treatment* must be modified accordingly—depletion being avoided, or used with the greatest caution, and full diet and even stimulation being not unfrequently called for.

As examples of inflammations which may be either sthenic or asthenic, I may mention *erysipelas, dysentery, peritonitis, pneumonia, gout.*

The first three† of these are at times epidemic; and *then* it is that the greatest number of asthenic cases is observed. The following maxim may be considered as fully established:

Whenever any local affection, as dysentery, peritonitis,

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* Granting that *all* disease is *debilitating* (Inman), the distinction is still valid and important, as to the different *degree* of depression produced by its different forms or types.

† Pneumonia is also sometimes endemic or epidemic, in the form of *typhoid* pneumonia.

catarrh or pneumonia, occurs sometimes **sporadically** (*i.e.* in altogether separate or independent cases) *and sometimes endemically or* **epidemically** (*i.e.* a number of cases at the same place and time, under a common local or temporary cause), *the* **latter** *cases exhibit, as a rule, the greatest tendency to* **depression** *in their symptoms, the largest mortality, the least tolerance of depletory treatment, and the most frequent need of stimulation or support.*

By **febrifuge** treatment is meant, that which is proper during the existence of the febrile state. It comprises no violent measures of any kind.

Remembering that the essential phenomena of fever are, increased *heat*, especially of the exterior of the body, *dryness* of its surfaces, *scantiness* of *fluid* in all the discharges, with actual *increase* in their *solids*, from accelerated tissue-metamorphosis,—our therapeutics must be adapted to these conditions. Apart from the necessity of removing or antagonizing, if possible, the *cause* of the febrile disturbance, the indications are, to **allay** the **heat** and **dryness** of the surfaces of the body, tegumentary and mucous, and, to *favor* the **removal** of **excreta**, accumulated in unusual amount in the blood and organs.

For these purposes, we may use

Moderate laxatives;
Saline diaphoretics;
Cold drinks;
Tepid ablutions.

Of these measures, I have no doubt of the propriety of the designation of **water** as the *heroic* remedy, to which the others are merely adjuvants. Diaphoretics will scarcely

act at all without free imbibition of water, and the operation of laxatives is much promoted by it. Water *alone* is diaphoretic, diuretic, and laxative; but it may be *aided*, to an important degree, in alleviating the symptoms of fever, by the addition to it of citrate of potassa, acetate of ammonia, etc.

I have already laid emphasis upon the statement, that no one now thinks of *bleeding* for fever, as such. In a much more strict sense, pathologically speaking, than inflammation, the febrile *nisus* is *self-limited*, although variable in its duration according to the cause inducing it. The object of the physician is *not* to *cut it short* (*jugulare*), but to conduct it safely to a critical termination. In an equally important practical manner, this principle applies, not only to the management of a brief or ephemeral exacerbation or paroxysm of irritative or reactive fever, but also to those of longer duration, under toxæmic (zymotic) causation: as *exanthematous* (rubeolar, scarlatinal, variolous) or *continued* (typhus, typhoid) fevers. An exception is believed by many to exist, in the case of autumnal, miasmatic, periodical fevers: *i.e. intermittent, remittent,* and *pernicious* (congestive); in which, interference, by the *antidotal* remedy, cinchona or its alkaloids, is considered *safe at all times*, and sometimes necessary before the subsidence of fever. But I believe this exception to be only partial, since the most careful recorded experience has given rise to the conclusion* that quinine is *never necessary* during the *height* of the exacerbation of either type of miasmatic fever, and that in large doses at that period

* See Medical Statistics of United States Army, 1839–54.

it *may do harm*. It is, I consider, the best practice always, in the treatment of autumnal remittent (bilious) fever, to wait, *until the febrile stage has passed its climax*, and its symptoms have *begun* to decline—the urgency of the case, and all its circumstances, then, guiding the practitioner as to *how soon*, as well as how largely, the special remedy, whose interference is called for, must be introduced.

It is a matter of general remark, that patients scarcely ever die during the *hot stage* of any kind of fever. In the most intense form of miasmatic poisoning, called *pernicious fever*, the danger exists in the extreme depression of the *cold stage;* if fever comes on, the patient is comparatively safe for the time.

The **supporting** treatment is that adapted to states of *prostration* or *debility*.

General weakness of the body (when not a *congenital* defect) occurs under three forms:—

Exhaustion;
Depression;
Oppression.

We are familiar with the first, **exhaustion,** as the effect of over-exertion, loss of sleep, deficiency of food, excessive discharges, etc., and as *following* acute, or constituting a *part* of chronic disease.

The second, **depression,** is to be discriminated from exhaustion, as resulting, not from expenditure or waste of the material or forces of the body, but from *interference* with their normal activity by some disturbing cause. To use a mechanical illustration, *exhaustion* is the *running down* of

it *may do harm*. It is, I consider, [illegible] ways, in the treatment of autumnal [illegible] fever, to wait, until the febrile stage has passed away, and its symptoms have begun to decline, before engaging the case, and all its circumstances [illegible] titioner as to *how soon*, as well as *how* [illegible] remedy, whose interference is called for, must be employed.

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the clock; *depression*, the *arrest* of the *impelling movement* of the weights, by which its wheels are kept in motion.

Oppression, then, may be compared to the *obstruction* of the *machinery* by some foreign body, or by some mechanical disarrangement among the wheels, which clogs their action until it is removed or corrected.

Exhaustion and *depression* have their chief seat in the nerve-central sources of dynamic force; *oppression*, in the circulation of the blood, or in some subordinate organs or functions.

This distinction, however recondite in *theory* it may appear to be, is of high **practical** importance. This will be seen on consideration of the remedies used and required in the different forms of debility.

Supporting measures may be classified as—

1. **Stimulant**;
2. **Analeptic** (recuperative, restorative).

Under the first head we rank the preparations of *ammonia* and *alcohol*, etc., as usually employed.

Under the second are included *generous diet*, *tonics*, *chalybeates*, *cod-liver oil*, *change of air*, etc.

Now the *first* of these (**stimulants**) are adapted especially to *acute prostration* or *depression;* the second class (**analeptics**), to *chronic prostration* or *exhaustion*. *Oppression* or *counterfeit* debility, generally requires *neither*, being benefited by very different treatment. A *mingling* or *blending* of these states is of course possible; and then a union of measures is right, to meet the conjoined indications.

Oppression (simulating depression) is every day illustrated by the condition of a patient in the early stage of

any of even the mildest acute disorders; as, catarrh or bronchitis, indigestion, tonsillitis, measles, etc. In all of these cases, especially where *fever* is developing, the patient is very *weak;* not only as to his muscular apparatus, but in the performance of all the animal and organic functions. But *stimulation,* for such a condition, in persons of ordinary constitutional vigor and soundness, would be generally *inappropriate,* often injurious, sometimes dangerous.

A more serious degree of oppression occurs in some cases of visceral congestion, particularly of the lungs or brain; and in violent spasmodic affections of the alimentary canal, with constipation of the bowels. *Uræmia,* from inaction of the kidneys, presents another case of oppression, in which even a fatal result may occur.

Counterfeit debility or oppression, then, to recapitulate, may occur in—

The *first stage* of all acute diseases;
The *febrile state;*
Indigestion or *dyspepsia;*
Congestion of the brain, lungs, etc.
Obstruction of the bowels;
Uræmia.

The *first* of these instances is to be treated usually by measures which promote reaction in the mildest manner. More doubt exists, however, if the *cold stage* itself be intense or profound—as in pernicious intermittent—constituting a *depression,* under *toxæmic influence.* Of this, a word or two presently.

The *febrile* oppression is to be managed simply by those palliative measures mentioned already under the head of *febrifuge treatment.*

That of *indigestion* is usually *temporary* or *occasional* only; and gives way under the use of antacids, carminatives, blue pill, etc.

Violent *congestion* of the *brain* or *lungs*, occurring in a person of previously good constitutional strength (although it may produce the most absolute debility, which, especially in the case of *pulmonary* congestion, masks the cause of the disorder), calls, if the diagnosis be clear, for counter-irritation and the local or general abstraction of blood. In doubtful cases a *tentative* plan may be pursued: abstracting but a minimum quantity at first, being encouraged to repeat and enlarge the depletion only if the result be favorable.

Constipation, producing oppressive debility, is of course to be met by agents calculated to unload the bowels; antispasmodics, anodynes, etc. being also indicated, if colic exist, and be not relieved by laxatives alone. In absolute (mechanical) *obstruction* of the bowels, causing or endangering enteritis or strangulation, the treatment, now generally adopted, is, to depend upon *opium* and *rest, avoiding* purgatives.

Uræmia demands all the means within our power to restore the action of the kidneys; and to aid them in their eliminating duty by favoring the *cutaneous* transpiration and secretion.

I have already said that mixed cases of oppression and depression occur, in which the indications of treatment are, to a certain extent, obscure and doubtful. Such are, the cold stage of pernicious (congestive) intermittent, the incipiency of the algid or collapsed stage of epidemic cholera, etc.

It is clear that **reaction** is here to be brought about, if possible; and that *external* stimulation, by powerful rubefacients, frictions, etc., is altogether appropriate; but, however authoritatively rules may have been laid down, it is not so certain, in *every* case, whether *alcoholic stimulation* or *venesection* would afford the better result, or whether some cases might not be benefited by *both combined.* The *incompatibility supposed* to exist between blood-letting and stimulation is in fact *not intrinsic,* but *circumstantial.* Holding distinctly in our minds the principle that the object of blood-letting is to **balance** the quantity, consistency, and distribution of the blood, and *not* to reduce the strength of the patient, it is far from impossible that the balancive action especially of **local** blood-letting may be called for in a case in which the forces require to be sustained at the same time by "**supporting** treatment."

Personal experience, however, is indispensable to the application of these, or any analogous principles, to cases, in regard to the management of which the profession has been, but we may hope will not always be, divided.

Depression is exemplified in the state produced by—

Severe injuries; e.g. railroad accidents; extensive burns, etc.

Mental shocks; e.g. terror or great grief.

Withdrawal of accustomed stimulation; e.g. delirium cum tremore.*

Intense toxæmia; e.g. cholera collapse, etc. (see above).

Gouty spasm, of the heart or stomach, etc.

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* It is not intended, of course, to indicate that *all* cases of delirium tremens are referable to this cause.

Stimulation by alcohol, ammonia, ether, opium, camphor, turpentine, capsicum, etc. is needed, with greater or less urgency, and in larger or smaller doses, in all of these conditions; always bearing in mind the probability of *reaction*, and avoiding, as far as possible, the exaggeration of this reaction into fever.

The prostration of *typhus fever*, in a *majority* of cases (*not in all*), and that of *typhoid* fever, in a *minority* of cases, requires, especially after the height of the fever has passed, alcoholic stimulation, as well as support by concentrated liquid nutriment at short intervals.

The instance of these fevers affords us a sort of intermediate gradation between what I have called **acute** and **chronic** debility.

In regard to the *latter* (the debility of convalescence, chronic disease, etc.), certain principles are agreed upon by all physicians, on the ground of experience, confirmed by the deductions of physiological science. We shall first briefly consider some of these, and then one or two debatable points akin to those already alluded to.

The two most important and familiar results of clinical experience in the treatment of debility, are, the superiority of the pure vegetable **bitters** in **stomachic** and *digestive* weakness, and of **iron** in **anæmia** (spanæmia). The influence of **quinia** and cinchonia in **nervous** debility is almost as assured. The confidence of many physicians is strong in the utility of the **mineral** tonics (zinc, copper, arsenic, and silver salts)* in debility with **nervous symp-**

* Bromide of potassium promises to assume a somewhat important place in this list.

toms; *e.g.* chorea, hysteria, etc. I believe this confidence to be deserved, to a considerable extent; but, some of the diseases in which these medicines are given (*e.g.* epilepsy) will, in many instances, baffle all treatment. The use of **strychnia** in certain cases of **paralysis** is also well established; although requiring much care and *discrimination.*

Cod-liver oil holds, at the present time, a very high place in the list of analeptics. All medical observers are not of one opinion in regard to its value; but most of them believe it (on the basis of experience in practice) to be the best and most reliable (where it is tolerated) of all recuperative medicines; not only in consumption, but in all other wasting diseases.

The theory of the *mode of action* of cod-liver oil as an analeptic is an interesting subject. Dr. Bennett's view of phthisis is, that the error of hæmatosis, from which tubercle results, consists in an *excess of* **albumen** in the blood, with a *deficiency of* **oil**; so that, in the process of cell-formation, the first step of which is believed (Ascherson) to be the investment of *oil globules* in *albuminous envelopes*, an imperfection exists, fatal to the subsequent development of the cell and obliging it to abort. But, the debilitation of the *digestive and assimilative* functions in phthisis renders it impossible, by ordinary food, to supply the desiderated oleaginous matter to the blood. *Cod-liver oil* is fatty matter which, by the assimilating action of the liver, following the process of digestion, is **prepared** *for immediate absorption* and **appropriation** by the blood, for purposes of nutrition. This rationale of its influence is, although not demonstrable, much more probably correct than that which

refers it to the presence of *iodine, phosphorus,* or any other special ingredient which it may contain.

The **phosphates and hypophosphites** have of late attracted a great deal of attention. I do not consider the question at all settled, as yet, as to their value; and do not feel competent to pronounce an opinion upon them. My *impression,* however, is, that the phosphate of *iron* is the best of them all, and that they will be found secondary and inferior to cod-liver oil. Allusion to the newly introduced dog-fish oil, shark oil, etc., would be more proper in connection with the subject of *materia medica* than here.

What is the proper place of **alcoholic** beverages or preparations in the treatment of **chronic** debility, such as that of phthisis, etc.?

This important question opens a discussion, only the main elements of which can be noticed in this work.

In the first place, the theory of the action of agents called stimulants is almost universally mis-stated in authoritative treatises. It is commonly laid down that "one of the laws of all stimulation, whatever may be its degree, is, that it is followed by a depression proportionate, at least approximately, to the previous exaltation of the function or functions excited."

The true law is this: that all stimulation which is **excessive** is followed by a depression *corresponding to the excess;* while all that merely excites any function *up to par* (to use a familiar expression), *i.e.* to or toward its **normal** activity, does, so far, only good, with no *resulting* debilitation, however it may fail, from want of other conditions, to sustain the organ or system at the point desired. To deny this, would be to ignore some of the most obvious

of physiological facts. Heat is a stimulant in the life force; oxygen to all the active functions; blood is an excitant as well as food to all the tissues it reaches; and all those impressions upon the exterior of the body which give rise to instinctive and automatic actions are stimulant, without any necessary ulterior depression. Nor do I see how the use of stimulants in any supposable case of disease could be rationally justified, if we *practically* admitted the force of the law as commonly stated; since if, after every dose of an excitant, the patient sinks as far *below* the condition for which he was treated, as the intended remedy raised him for the moment *above* it, of course a mere *oscillation*, and no advantage, must be the result.

This, however, is theory; which has not governed practice on this subject. Another interesting physiological question—"does alcohol contribute to the **material**, or to the **force** of the economy, or only excite some of its organs to exhaustive **action**?"—has been the topic of able and learned disquisitions. I venture merely the opinion that it may do *either* of the three, or *neither*, according to the **circumstances** and the **quantity** of its administration. When there is *scarcity* of *food*, or *difficulty* of *digestion*, alcohol may contribute to the needed material; its carbon, hydrogen, and oxygen going to repair the *adipose* tissue at least. When there is *excessive exertion*, alcohol may sustain the flagging forces of the system. When given in *mere excess*, as with the intemperate, it excites to exhaustive action, organic if not motor; even when the bloated body shows increase in *quantity* of material, its *quality* being more or less degenerate.

In a word, then, the phrase "**accessory** food" is a happy

one. When *unnecessary*, as in full health, alcohol is injurious precisely in proportion to the quantity used; and the same is true in disease, when the quantity given is disproportionate.

This is the important practical precept. Alcoholic stimulus should never be taken in quantities which produce circulatory or cerebro-nervous *disturbance* or *super*-excitation. If this rule be observed, not only will it be a valuable *supporting* agent in phthisis and other complaints, but no *dipsomania* (methomania) or morbid thirst for it will arise; *that* terrible disease always growing out of excess. Upon this principle, in the use of alcoholic beverages in cases of ordinary debility, the common table doses are, medically speaking, *too large*.

Alcohol, in advanced or advancing consumption, in low fever, and in other analogous cases, when used in due proportion, is useful—

1. By its direct excitant and supporting power.
2. By aiding the enfeebled stomach to digest a larger supply of food.
3. By tending to retard tissue-metamorphosis.

This last action is one which alcohol has been shown (Böcker, Hammond) to have, in common with other agents, used as medicines or luxuries; coffee, tea, morphia, quinia, etc. I have alluded to it in our classification of remedies, under the head "economic medicines."

We must not dismiss the subject of the treatment of chronic debility without one further remark, upon the importance of rest in cases of exhaustion from over-exertion. The popular truism, that *exercise is beneficial to health*,

has been often *abused* by applying it almost *universally* to invalids or valetudinarians.

The one remedy for the immediate effects of **over-exertion** *is absolute and prolonged* **repose.**

The time required for recuperation, after *cerebral* overfatigue, may be counted rather by *months* than weeks or days; and it is quite possible for *irreparable* mischief to be done to the brain or spinal marrow by neglecting too long the demand of nature for rest. With many others, the author must acknowledge indebtedness to Professor Jackson, of the University of Pennsylvania, for the judicious emphasis of his teaching upon this point.

It is an important hygienic and therapeutic law, that exercise, to be beneficial, must be proportioned to the strength of the individual; and must never be carried to the extent of actual fatigue or temporary exhaustion.

Antidotal treatment is a topic of great interest. Its *idea* is probably the oldest in medicine. *Specifics* always have been looked upon as the *magna bona* of therapeutical science. Unfortunately, however, their number, instead of increasing, has *diminished* under the inexorable scrutiny of modern investigation. Yet, there is room for hope that they may again *positively* increase, with the diligent application of the same means of observation and discovery.

In the largest extension of the term, antidotive remedies may be classified thus:—

Positive antidotes:

Chemical palliatives;

Antacids;

Antilithics.

Chemical antidotes;

Antitoxics.

Anthelmintics;

Antipsorics.

Constructive antidotes:

Anti-periodics;

Anti-syphilitics;

Anti-scorbutics.

Tentative antidotal remedies:

Anti-arthritics;

Anti-rheumatics;

Anti-zymotics.

The familiar use of **antacids** as palliatives in dyspepsia, etc., needs no remark.

Nor have we occasion to dwell, here, upon **anti-lithics**; *i.e.* solvents for urinary solids, prescribed on chemical principles; as, alkalies for excess of uric acid or the urates, mineral acids for excess of phosphates or oxalates.

The subject of **chemical** *antidotes* for poisons belongs to *Toxicology.*

Anthelmintics are best treated of in the department of *Special Therapeutics.*

Anti-psorics, or specific remedies for scabies (itch), are represented generally by sulphur; which, although not at all the *only* agent capable of destroying the morbific *acarus,* is the most convenient. Other cutaneous parasites (nosophyta) are also destroyed, but with less certainty, by preparations of mercury, etc.

Of "**constructive** antidotes," the most important are the alkaloids of **cinchona,** applied to the treatment of **miasmatic** affections (anti-periodics). Medical men are divided

upon the question whether quinia arrests intermittent fever, etc., by antagonizing (chemically) the miasmatic poison itself in the system, or (physiologically) by causing such an opposite impression upon the nervous centres as is capable of subverting the condition on which the periodical or paroxysmal affection depends. The last is the prevailing view. But, in either aspect, the cure of autumnal fevers and allied affections occurring under miasmatic influence (neuralgias, etc.) by *cinchonization*, is properly called **specific** treatment; as—

1. No other remedies (yet discovered) have the same power.

2. These remedies have no such control over any *other* diseases (*e.g.* typhus and typhoid fever, yellow fever).

The second proposition is asserted with positiveness, notwithstanding the experimental use of quinine in full doses, by a few practitioners, in typhus and typhoid fever, and its frequent administration in yellow fever.

In stating that no other medicines, yet discovered, have the *same* power, I mean, to a degree or with a certainty at all comparable to that of the cinchonic alkaloids. The nearest approach to this is afforded by *arsenic*.

It is, however, a remarkable and important fact, that, when the recurrence of the paroxysms of intermittent fever has been allowed for a long period (**chronic** intermittent), and the system of the patient has become debilitated and **anæmic**, quinine will only **interrupt**, but *will not cure* the disease. **Iron** *is, then, the remedy.*

Opinion is divided as to the value or necessity of **mercury** as an **anti-syphilitic**. In the primary disease, I am a

full believer in its importance; against which its frequent *abuse* furnishes no argument. In secondary syphilitic affections, *especially* syphilitic **rheumatism, iodide of potassium** exhibits decidedly specific powers.

Anti-scorbutics are most valuable as *preventives* of scurvy; but will promptly relieve it, also, when it has occurred. All **fresh vegetables** belong prominently to this class; certain plants not so used, as the cactus opuntia, are included in it; the juice of **lemons,** limes, etc, is of service for the same end, and the neutral salts of potassa have been largely employed, with variable results.

Tentative antidotal treatment,—for diseases in which there is evidently (as a *part* at least, if not the primary part of the malady) *humoral* disorder, such as gout, rheumatism, the exanthemata, etc.,—affords a large field for study and ratiocination. The positive *facts*, so far, are few; the *hypotheses*, legion.

In **gout, colchicum** has long held, deservedly, the first place, as either an *eliminative* or *antidotal* remedy. Most observers have given it the first title;* Dr. Garrod's experiments induce him to prefer the *idea*, if not the phrase of the latter. **Alkaline salts** *of organic acids*, as bicarbonate of soda, or bicarbonate of potassa, or tartrate of potassa and soda, and the *alkaline earth, magnesia*, have also a large share of confidence in the treatment of gout. After all, however, so incomplete is any curative plan as

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* Colchicum has been shown, by Krahmer and Hammond, (*Proceedings of Biological Department of Acad. of Nat. Sciences of Philadelphia*, Nov. 1st, 1858,) to *increase the amount of the solids* of the urine, more decidedly than any other vegetable diuretic.

yet devised, that a large margin is left for patience and opium.

The same is true of **rheumatism**; especially in its distinctive form, of *acute articular rheumatism*, or **rheumatic fever.** Colchicum is here also much given; but *in the absence of the gouty diathesis,** hereditary or acquired, it will *generally disappoint.* **Alkaline salts** are, at the present moment, the favorite tentative anti-rheumatics. Lemon-juice has been freely employed by some practitioners. Phosphate of ammonia was for a brief time in vogue. Calomel and opium are the reliance of many. Certain enfeebled cases, with free perspiration, will recover speedily under *quininization.* But in all these modes of treatment there is no *specific* **certainty.** The attack will last from one or two to six or eight weeks with all. In **chronic** rheumatism we resort, with the same *hope*, to guaiacum, spirits of turpentine, iodide of potassium, cod-liver oil; but often our hope is much lengthened out. Of *propylamin*, a remedy for rheumatism imported not long since, I have had no experience, and have no basis for an opinion.

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* Garrod insists on the diagnostic importance of the *uric acid test* for gout. It is easily applied, as follows: Take about fʒjss of the serum from a blister, or from the blood drawn by venesection or cupping, and place it in a flat dish or watch-glass. Add to this fifteen drops of acetic acid, and place in it two or three threads of cotton. Allow the glass to stand in a warm room for one or two days, to evaporate. If the cotton-fibres be then removed and examined microscopically with an inch object-glass, they will be found, if the serum contained uric acid, to be covered with its crystals, arranged somewhat as the crystals of sugar-candy form on a string.

The search for and trial of such remedies is, however, certainly altogether legitimate.

In the management of the **zymotic** affections, the only great triumph of medical art has been one of **prevention. Vaccination** affords an instance of effectual control over one of the most destructive and loathsome of pestilences, by the interference of the physician. As to the **treatment,** even of small-pox itself, when it has occurred, and of scarlet fever, measles, chicken-pox, hooping-cough, and mumps, we are forced to confess our powerlessness, except to conduct the case, by the aid of **palliative** measures, to its natural and spontaneous termination.

This is equally true of **yellow fever.** There is **no specific** yet known for this terrible disease. Quinine, mercury, etc. have failed in the hour of need too often to be relied upon. It is to be **palliated,** as it *cannot be cut short.*

Nor have we any specific for epidemic **cholera.** Antispasmodics, at very short intervals of administration, and ice, with free external stimulation, will conduct many cases to a successful close; but this is not **antidotal** treatment. I am fully satisfied that *calomel,* in true epidemic cholera, is altogether *useless.*

In the medication of zymotic affections having, as a local symptom, inflammation of the mucous membranes, with unusual tendency to (septic) decomposition or **disorganization,**—*e.g. scarlatina* and *diphtheria,*—**chlorate of potassa** and other preparations of chlorine, as tincture of **chloride of iron,** have achieved recently a very wide-spread reputation.

The last-named of these medicines, the tincture of the

chloride of iron, appears also to have an excellent effect (although we can hardly call it antidotal) in *asthenic* **erysipelas.**

En rêsumê, we may say that all endemic, epidemic, infectious, and contagious diseases are naturally **self-limited**; and that, so far, we have only reached a *curative* treatment for one class,—viz. intermittent, remittent, and pernicious (classed together as **miasmatic**) fevers; and a **preventive** treatment for another, small-pox.

While, therefore, for yellow fever, scarlatina, pertussis, etc., we are without the possession of any *specific* or *antidotal* treatment, the **palliative** plan is the one for us to pursue. All attempts, by violent measures, to cut short either of these diseases, while they fail to attain that object, will endanger the patient, by lowering his forces, and thus promoting the victory of the depressive toxæmic cause.

Yet, I repeat, we are not to abandon or reject the hope that observation and cautious experiment, guided by the lights of advancing science, will enable us hereafter to discover remedies as potent in the management and control of scarlet fever, yellow fever, and cholera, as quinine is in that of ague, or vaccination in the prevention or salutary modification of small-pox.

Alterative treatment is distinguished, in our classification, it may seem arbitrarily, from the *antidotive*. All antidotes may be said to be alterative, but all alterative medicines are not antidotal; as the latter expression implies at least the *probable*, if not the known existence of a **material cause**, against which the antidote is to act. Yet the dis-

tinction is not one upon which we can *insist*, although it appears convenient.

The term *alterative* is by no means a mere apology for ignorance; it involves an important therapeutical principle; viz., the **supplanting** or displacing of a morbid impression, condition, or process in the body, by the **safer** impression and **counteraction** of a medicinal agent. The influence of the latter, physiologically speaking, may be, *per se*, abnormal; yet, having a sanative purpose, it is therapeutic.

This principle may be sufficiently illustrated by allusion to two or three examples. In the peculiar and often violent inflammation of the throat in scarlatina, or in that of diphtheria, the free application of a *strong solution of nitrate of silver* to the part will almost invariably arrest (if used *early*) the morbid process: converting it, at all events, from a *specific* and *dangerous* into a *simple* and *mild* phlogosis.

So will the powerful impression of the solid nitrate of silver, or other caustic, upon the surface of the penis affected with *chancre*, *supplant* the *venereal* process, and leave in its place a benignant ulcer.

When erysipelatous inflammation is spreading like a conflagration from part to part, a blister, or tincture of iodine, etc., will form a *cordon sanitaire*, by inducing its own milder irritation in advance of the disease.

The most essential part of the treatment of chronic *diseases of the skin*, is either **alterative** or **antidotal**. *Parasitic* affections, as scabies, favus, mentagra, etc., require the destruction of the epizoon or epiphyte by an antidote. Others, as eczema, lichen, impetigo, lepra, etc.,

when at all obstinate, are treated in the *same manner* essentially, to whichever class the disease may belong. Why? Because the **principle** is the same in all—the *alterative* principle. The abnormal, perverted nutrition of the cutaneous tissue, whether it be deeply or superficially affected, is (apart from antiphlogistic or sedative treatment, called for in some cases) to be *subverted*, by a decisive change in all its conditions; and, speaking boldly, it is little matter *what* change, so it be considerable. Any means which will hurry the removal of the old, diseased skin, and favor the immediate construction of a new layer, will be *curative*, whether it be only soap, water and frictions, mercurial ointment, vesication, or the actual cautery. And the same principle explains and justifies the *internal* use of arsenic and mercury in the management of so many very *diverse* forms of cutaneous disease—the indication for alterative medication being the same in all.

The administration, for **long periods**, of minute doses of powerful alterative medicines, in the treatment of chronic affections which resist other management, is less common now than formerly, on account of the explosion of some old hypotheses connected with it. It is very possible that in this, as in some other medical reforms, we may have gone too far.

Agents which tend with any degree of constancy to **increase** the rate of metamorphosis of tissue in the body, are few. It is well known that most of the diuretics given for the removal of dropsical accumulations, increase only the **fluid** secretion of the kidneys, affecting little or not at all their *solid* excreta. But there is good reason to believe

that potassa and soda, and some of their compounds, as well as iodine and mercury, do hasten the disintegration of tissue. Iodide of potassium has been shown, by Melsens, to be in this way *eliminative* of lead, laid up in some organ (probably the liver), removing it in the shape of iodide of lead.

If any possible measures, beyond attention to hygiene and repose, can benefit cases of *organic* **degeneration,** we might hope for advantage from the combination of tonics or analeptics with alteratives. Dr. Chambers (on *Digestion and its Derangements*) remarks thus:—

"In Bright's disease I know of no treatment so advantageous as that which unites **alteratives** (that is, liquefacients of tissue) with those **restorers** of blood *par excellence*, iron and animal food."

Iodide of iron, or iodide of potassium at the same time with **cod-liver oil,** may afford an example of this sort of medication in its simplest form. Its object is, to favor the rapid removal of old tissue, and the formation of good new structure in its place.

At the same time, we must not encourage sanguine hopes in any instance of organic degeneration, the origin of which is, so generally, to be found in a failure of systemic vital power. The physician will do much for his patient, if he can persuade and instruct him to **adapt** his living to the actual condition of his physical resources, so that, whether his malady be Bright's disease of the kidney, cirrhosis of the liver, or fatty degeneration or other organic lesion of the heart, he may **economize** both the material and the force of his system, by such a regimen of diet, exercise, and excitement, as his state requires.

Nor need we look upon the failure of medicine to arrest the process of organic degeneration as a subject of very humiliating discouragement. As death is the natural result of life, in the human organism as in every other material form, this partial death occurs, also, under **physiological laws**; and, if it be premature in certain instances, we may believe that this, too, may be traced to a near or remote causation, in perfect harmony with the highest interests, moral as well as physical, of man.

The following may, in recapitulation, be stated to be the *most general* desiderata in the management of all diseases:—

Rest;

a, in all *acute* diseases;

b, in all cases of *exhaustion.*

Balance;

a, of the *fluids*, and solids;

b, of the activity of *functions.*

Normal **blood-change;**

a, due removal of *excretions;*

b, absence of morbid *poisons.*

Support;

a, in all *asthenic* cases;

b, in *later stages* of sthenic cases.

CONCLUDING MAXIMS.

1. All **pathology** is but the **physiology** of organic **perturbations.**

2. Never **interfere** actively in disease without a distinct **object.**

3. **Act** only upon *scientific* **reason,** or *well-defined* **experience.**

4. Treat the **cause** of disease *whenever* it is **possible.**

5. **Watch** *always,* and treat *when* **requisite,** the **condition** of the *patient.*

6. **Avoid,** especially, **routine** treatment according to the *names* of diseases.

7. Use *no* **violence** with **self-limited** diseases.

I believe that a sound "theory of medicine" may be expressed in a single paragraph, thus :—

Physiological **optimism** is the aggregate tendency of all the forces of the living organism, under the controlling influence of the *vital force.* But, the *best possible* result in a given case may, from its **conditions** *and circumstances,* fall far **short** of *health.* Medicine, then, is to **favor** *or* **supply** *those conditions which, under natural laws, allow* or *promote* the **best result.**

In aiming to fulfil this duty, the art of healing must *always* depend, *in part,* upon empirical **observation** (which **every** branch of knowledge requires), and *in part* upon inductive **science.** But in both alike, the physician is, or should be, "*naturæ minister et interpres.*"

GLOSSARY.

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A

Abnormal. Unnatural, irregulár, unhealthy.

Abrasion. Removal of a portion of skin, by violence or ulceration.

Acclimatize. To inure to a new climate.

Acinesia. Loss of muscular power.

Acne. A pustular disease of the skin, involving the sebaceous follicles.

Acute. Active, recent, of brief duration.

Addison's Disease. Bronzing of the skin, with debility, and degeneration of the supra-renal capsules.

Adenoid. Glandular, or gland-like.

Adipose. Fatty.

Adynamic. Prostrate; without power.

Ægophony. Goat-like or bleating sound of the voice, heard on auscultation.

Afflux. Flow toward a part.

Albinism. Loss of natural pigment, causing *whiteness, e.g.* in the negro.

Albuminuria. The presence of albumen in the urine.

Algid. Cold.

Alopecia. Baldness; loss of hair.

Amaurosis. Partial or total blindness from an affection of the retina, optic nerve, or brain; *i.e. nervous* blindness.

Amblyopia. Dim, or obscure vision.

Amenorrhœa. Absence or arrest of menstruation.

Amorphous. Shapeless; without definite form.

Amphoric. Pitcher-like, or decanter-like. Applied to sounds heard by auscultation or on percussion.

Amyloid. Resembling starch.

Anæmia. Deficiency of red blood.
Anæesthesia. Absence or loss of sensation and perception.
Analeptic. Invigorating, restorative.
Anasarca. General dropsy of the areolar tissue.
Aneurism. Morbid dilatation of an artery, with or without rupture of its coats.
Anfractuous. Having an irregular, grooved, or broken surface; applied to a cavity in the lung.
Angina. A choking or suffocating disease.
Angina Pectoris. A paroxysmal affection, with great pain and distress about the heart, and difficulty of breathing.
Anodyne. Tending to relieve pain.
Anorexia. Loss of appetite.
Anthelmintic. Destructive of, or tending to cause the removal of, worms.
Anti-arthritic. Curative of gout.
Anti-lithic. Solvent of stone or gravel.
Anti-phlogistic. Tending to arrest or mitigate inflammation.
Anti-psoric. Curative of itch.
Anti-toxic. Antidotal to poison.
Apex. The uppermost point.
Aphonia. Loss of voice.
Aphthæ. Small whitish ulcers, originating in vesicles; frequently found in the mouth, especially in children.
Aplastic. Inorganizable.
Apnœa. Arrest of respiration.
Applicata. Things applied to, or brought into contact with, the exterior of the body.
Apyrexia. Intermission.
Arachnitis. Inflammation of the arachnoid membrane.
Arcus senilis. Opacity of the outer circle of the cornea, in old people, from fatty degeneration.
Arthritis. Gout.
Ascarides. Round worms.
Ascites. Peritoneal dropsy.
Asphyxia. Suspension of breathing, or of the aeration or circulation of the blood.
Asthenia. Debility.
Asthenic. Without strength; feeble; attended by prostration.
Ataxic. Irregular; out of order.

Atelectasis Pulmonum. Imperfect expansion of the lungs.
Atheroma. A pulp-like or pap-like formation or degeneration.
Atony. Loss of tone.
Atrophy. Absence or defect of nutrition.

B

Balancive. Promotive or restorative of balance, proportion, harmony.
Biology. The science of life, and of the functions of living beings.
Blastema. Material out of which tissue is or may be organized.
Bleb. See Bulla.
Borborygmus. Intestinal gurgling.
Bright's Disease. Fatty or other degeneration of the kidney.
Bronchocele. See Goitre.
Bronchophony. Resonance of the voice, in the *lung*, like that normally heard in the *bronchial* region.
Bronchorrhea. Excessive discharge of mucus from the bronchial tubes.
Bulimia, Boulimia. Excessive appetite.
Bulla. A blister; *i.e.* an elevation of the cuticle, containing serum.

C

Cachexia. A depraved or diseased habit of system.
Cadaveric. Belonging to the dead body.
Calcareous. Containing or resembling chalk or lime.
Calculus. Stone.
Calvaria. The cranium.
Carcinoma. Cancer.
Cardialgia. Heart-burn.
Catalepsy. A nervous affection, characterized by paroxysmal rigidity of the muscles.
Catarrh. An affection of a mucous membrane, characterized by increased secretion.
Cavernous. Connected with or indicative of a cavity.
Cephalalgia. Headache.
Cerebritis. Inflammation of the brain.
Chalybeate. Containing iron.
Chloasma. Liver-spot; a yellow discoloration of the skin.

Chlorosis. "Green sickness;" a cachexia peculiar to young woman.
Cholagogue. Tending to increase the flow of bile.
Chondroma. A cartilaginous tumor.
Chorea. St. Vitus' dance.
Chronic. Protracted; continuing, without much change, for a considerable period.
Cinchonism. The production of the characteristic effects of Peruvian bark, or of its alkaloids, upon the system.
Circumfusa. Things surrounding the body: *e.g.* air, light, moisture, etc.
Cirrhosis. Waxy degeneration of the liver.
Clavus. A corn.
Clonic. Successive, interrupted, alternating.
Colica pictonum. Lead colic.
Colliquative. Copious, exhaustive.
Colloid. Jelly-like.
Coma. Completely unconscious stupor.
Congenital. Existing at the time of birth.
Congestion. Accumulation of blood.
Consonance. Repetition or reduplication of sound, by the sonorous vibration of a body upon which it impinges.
Contactive. Contagious.
Contagious. Conveyed by touch or actual contact.
Contra-indicate. To prohibit.
Contro-stimulant. Sedative.
Corneitis. Inflammation of the cornea.
Coryza. A cold in the head.
Cosmic. Belonging to the universal system or order of nature.
Coup de soleil. Sun-stroke.
Coxalgia. Disease of the hip-joint.
Crepitant. Crackling; applied technically to the *fine* crackling heard on auscultation in pneumonia.
Cretify. To convert into a chalky substance.
Crusta lactea. Milk crust; a cutaneous disease of infancy.
Cutaneous. Pertaining to the skin.
Cyanosis. Blueness, from imperfect circulation or aeration of the blood.
Cynanche. Angina.
Cyst. A sac, cell, or bag, formed of membrane, and containing more or less fluid.
Cystitis. Inflammation of the urinary bladder.

D

Decubitus. The manner of lying down.
Decussation. Crossing, X-like, from side to side.
Dementia. Total loss of reason.
Dengue. "Break-bone fever" of the West Indies and Southern United States.
Depletion. Abstraction of blood, or other material, from the system.
Dermatophyte. A vegetation upon the skin.
Desideratum. Something desired or required; an important object.
Desquamate. To scale or peel off.
Detritus. Refuse; the result of wearing or breaking down.
Diabetes. Excessive urination.
Diabetes mellitus. Excessive discharge of urine containing sugar.
Diagnosis. The discrimination of diseases; the determination of the nature of an attack, or of the condition of the organs in a given case.
Diaphoretic. Productive of perspiration.
Diastole. Dilatation.
Diathesis. A constitutional tendency, peculiarity or habit.
Dicrotous. Double-beating.
Diphtheria. Membranous sore throat.
Diphtheritic. Pseudo-membranous.
Diplopia. Double vision.
Dipsomania. Insane thirst or craving for stimulants; oinomania.
Diuretic. Productive of increased flow of urine.
Drastic. Active, powerful.
Dynamic. Relating to *power* or *force.*
Dynamize. To imbue with force or power.
Dyscrasia. A morbid state of the blood or of nutrition.
Dysmenorrhœa. Difficult or painful menstruation.
Dysphagia. Difficulty of swallowing.
Dysphonia. Hoarseness.
Dyspnœa. Difficult respiration.
Dysuria. Difficult urination.

E

Ecchymosis. Effusion of blood under the skin.
Eclampsia. Convulsion.

Ecthyma. A disease of the skin, characterized by *large pustules.*

Ectrotic. Abortive; productive of abortion.

Eczema. A *vesicular* eruptive disease.

Effete. Worn out; dead.

Elephantiasis Arabum. An enormous enlargement of the limbs, scrotum, neck, etc.

Elephantiasis Græcorum. A severe cutaneous affection, with purple tumors, etc.

Eliminate. To remove or drive out from the system.

Embolic. Obstructive; applied to a clot thrown as a plug into an arterial trunk.

Emphysema. Distention of a cellular tissue with air.

Empirical. The result of *observation* only; as contrasted with *rational* or *deductive.*

Emprosthotonos. Arching of the body forward.

Empyema. A collection of pus in the pleural cavity.

Emulsify. To suspend or diffuse an insoluble substance in water by means of mucilage.

Encephaloid. Brain-like.

Encephalon. The brain; *i.e.* the whole contents of the cranium.

Endemic. Local; confined to certain localities.

Endermic. Within or under the skin.

Endocarditis. Inflammation of the lining membrane of the heart.

Endosmose. The spontaneous interchange of fluids through organic membrane.

Enteritis. Inflammation of the bowels.

Entozoon. A worm, or other parasite, within an animal body.

Enuresis. Incontinence of urine.

Ephelis, Ephelides. Sun-burn.

Ephemeral. Continuing for a day.

Epidemic. Affecting persons over an extended region; migrating; not limited to any locality.

Epigastric. Over the stomach.

Epilepsy. A disease characterized by recurring convulsions, during which the patient is unconscious.

Epiphyte. A vegetable parasite.

Epistaxis. Bleeding from the nose.

Epithelioma. An epithelial tumor.

Epithelium. A thin, superficial layer of cells upon a basement membrane.

Epizoon. A parasitic animal or animalcule.

Equinia. Glanders; a malignant disease of the horse, sometimes conveyed to men.

Eremacausis. Decay, or slow combustion.

Erosion. Corrosion; destruction of tissue by chemical agency.

Eructation. Belching of wind.

Erythema. A florid inflammation of the skin; classed with the *exanthemata.*

Etiology. The study of the causation of disease.

Exacerbation. An increase of the symptoms; *e.g.* of fever; a febrile paroxysm.

Exanthem. A rash, or florid eruption.

Exanthemata. A class of diseases in which, with fever, there is an eruption characteristic of each.

Excito-motor. Reflex; relating to the production of movement in muscles by impressions transmitted through nerves and nerve-centres.

Excito-secretory. Reflex excitement of secretory organs, by distant impressions, transmitted through the nerves.

Excreta. Matters thrown out as waste from the body.

Exfoliate. To fall or throw off, like leaves from a tree.

Exosmosis. See Endosmosis.

Extravasate. To throw blood out from the vessels.

Exudation. The throwing out of lymph from the vessels during a morbid process. Also, the lymph itself which is thrown out.

F

Favus. Porrigo favosa; a contagious disease of the scalp, attended by the presence of a microscopic vegetative parasite.

Flocculent. Resembling locks of wool.

Fomites. Things supposed to retain and convey contagion or infection; as clothing, merchandise, etc.

Fuscedo. Yellow staining of the skin in patches or blotches.

G

Gangrene. Mortification.

Gastralgia. Pain in the stomach.

Gastritis. Inflammation of the stomach.

Gastrodynia. Stomach-ache.

Gastro-hepatic. Affecting both the stomach and the liver.
Gesta. Things *done;* actions; labors.
Glossitis. Inflammation of the tongue.
Glucohæmia, Glycohæmia. Excess of sugar in the blood.
Glucosuria, Glycosuria. The presence of sugar in the urine.
Goitre. Bronchocele; enlargement of the thyroid gland.

H

Habitat. The locality in which a plant or other living thing grows or abounds.
Hæmatemesis. Vomiting of blood.
Hæmatosis. Blood formation; blood development.
Hæmaturia. Voiding of bloody urine.
Hæmoptysis. Spitting of blood.
Hemicrania. Pain in one half of the head.
Hemiopia. Seeing only one-half of an object at a time.
Hemiplegia. Paralysis of the arm and leg, etc., of *one side.*
Hemorrhoids. Piles.
Hepatitis. Inflammation of the liver.
Hepatization. Conversion into a liver-like structure.
Herpes. Tetter; a vesicular eruption.
Heterologous. Different from anything natural to the body.
Homologous. Parallel to or resembling things natural to the body. In *physiology,* this word has a more *extended* meaning.
Hydatid. A vesicular formation, generally considered to be an *animal parasite,* found in various organs, causing their distention into cysts or tumors.
Hydræmia. A watery condition of the blood.
Hydragogue. Causing watery discharges.
Hydraulics. The mechanics of liquids; investigating especially the force and phenomena of liquid pressure and movement.
Hydrocephalus. Dropsy of the head:
Hydro-pneumothorax. The presence of water and air together, in the cavity of the pleura.
Hydrothorax. Water in the chest; thoracic dropsy.
Hygiene. The science of health.
Hygrometry. The measurement of the amount of moisture in the air.

Hyperæmæsthesia. Excess of blood in a part, with irritability; commonly called *chronic inflammation.*

Hyperæmia. Excess of blood in a part.

Hyperæsthesia. Over-sensitiveness.

Hyperinosis. Excess of fibrin.

Hypertrophy. Over-growth.

Hypnotic. Promotive of sleep.

Hypochondriac. In *anatomy,* the region over the liver, and the corresponding region on the left side. In *medicine,* a person affected with depression of spirits from dyspeptic disease.

Hypochondriasis. Dyspepsia with lowness of spirits and imaginary complaints.

Hypogastric. Below the stomach.

Hypostatic. The result of settling or gravitative deposition.

I

Ichorœmia. Contamination of the blood; pyæmia.

Icterus. Jaundice.

Icthyosis. Fish-skin disease.

Idiopathic. Primary; independent.

Idiosyncrasy. Individual peculiarity of system.

Ileus. Iliac passion. The most violent form of colic.

Impetigo. A pustular eruption.

Incubation. Development; maturation; the period between the introduction of a morbid cause and the appearance of the resulting disease.

Indication. The *pointing* of the signs of disease to the proper mode of treatment.

Induration. Hardening.

Infection. As frequently used, synonymous with contagion; still more commonly, including extension of disease from person to person, either by contact or through the air; in this work, restricted to atmospheric transmission, or the production of pestilential disease by local causes.

Infra-mammary. Below the mamma.

Ingestive. That which is introduced into the body by the alimentary canal.

Innervation. Supply of nervous influence.

Insomnia. Sleeplessness.

Internuncial. Communicating; transferring mutual impressions or excitations.

Interscapular. Between the scapulæ.

Intussusceptio. Convolvulus; the reception of one portion of intestine into another.

Iritis. Inflammation of the iris.

Ischuria. Difficult urination.

K

Kakotrophy. Perverted nutrition.

Keloid. An uncommon disease of the skin, with elevations slightly resembling tortoise-shell.

Kyestein. A greasy pellicle upon the urine, observed especially during pregnancy.

L

Lancinating. Lancing, piercing, darting.

Laryngitis. Inflammation of the larynx.

Latent. Concealed.

Lentigo. Freckles; sunburn.

Lepra. A scaly cutaneous disease.

Lesion. Injury; essential change.

Leucocythæmia. Excess of colorless or white corpuscles in the blood.

Lichen. A papular disease of the skin.

Lientery. Passage of undigested food through the bowels.

Lipoma. A fatty tumor.

Lithiasis. The formation of stone or gravel.

Lochia. The sero-sanguineous discharge following delivery.

Lumbago. Rheumatism of the lumbar region.

Lumbricus. A long round worm.

Lupus. A malignant affection of the skin, either tuberculous or ulcerative.

Lymph. The fluid portion of the blood, without the corpuscles; the fluid of the lymphatic vessels; also, the fluid exuded during inflammation.

M

Macula. A spot or stain.

Malaria. Bad or poisonous air.

Mania. Derangement, either intellectual or emotional, or both.

Marasmus. Wasting away.
Matrix. A formative or receptive structure or cavity.
Melanosis. Morbid deposit of, or conversion of tissue into, black pigment.
Meningitis. Inflammation of the membranes of the brain.
Menorrhagia. Excessive flow of the menses.
Mentagra. Sycosis; a contagious pustular eruption upon the chin.
Metamorphosis. Transformation.
Metastasis. The transfer of a disease or symptom from one part to another.
Meteorism. Distention of the alimentary canal with gas.
Methomania. The disease of habitual drunkenness; mania for strong drink.
Miasm. Marsh poison; the local cause of endemic country fevers.
Microphyte. A microscopic vegetation.
Microzoon. A microscopic animalcule.
Miliary. Resembling millet-seed.
Modus operandi. The manner of action or operation.
Molecule. The minutest particle into which matter can be divided.
Molluscum. An uncommon tubercular disease of the skin.
Monomania. Insanity upon one subject only.
Morbilli. Measles.
Muguet. Thrush.
Multiform. Having many shapes.
Myalgia. Pain (or soreness, tenderness) in one or more muscles.
Myelitis. Inflammation of the spinal cord.
Myeloid. Resembling the spinal marrow.
Myocarditis. Inflammation of the muscular tissue of the heart.
Myopia. Near-sightedness.

N

Nebulous. Cloudy.
Nephralgia. Pain in the kidney.
Nephritis. Inflammation of the kidney.
Nervine. Affecting the nervous system.
Neuralgia. Pain, the seat of which is principally in the nerves.
Neuroma. A morbid enlargement of a nerve.
Neurosis. A nervous affection.
Nisus. Effort; attempt; active process.

Normal. Natural; regular; healthy.
Nosography. The description of diseases.
Nosology. The classification of diseases.
Nosophyte. A vegetation connected with, or causative of disease.
Nostalgia. Home sickness.
Nucleolus. A central granule or spot within a nucleus.
Nucleus. The central body within a cell; being itself, frequently, hollow.
Nummular. Coin-like; applied to dabs of expectoration, rounded like pieces of money.

O

Ochlesis. Crowd poison.
Octohedral. Eight-sided.
Odontalgia. Toothache.
Œdema. Swelling, from watery effusion into the cellular tissue.
Oinomania. Insane craving for alcoholic stimulation.
Ophthalmia. Inflammation of the eye.
Opisthotonos. Arching of the body backwards.
Optimism. Tendency to the *best possible* result.
Organography. Delineation of the organs in their position.
Orthopnœa. Breathing only in the erect position; great dyspnœa.
Osteosarcoma. Cancerous tumor of bone.
Otalgia. Earache.
Otitis. Inflammation of the ear.
Otorrhœa. Discharge from the ear.
Oxaluria. Presence of oxalic acid (as oxalate of lime) in the urine.
Ozone. Oxygen in the nascent state, or with its chemical activity otherwise intensified (dynamized).

P

Palpation. Examination (of the chest, etc.) by the touch.
Papula. A pimple.
Paracentesis. Tapping.
Paralysis. Loss of power or of sensibility; palsy.
Paraplegia. Paralysis of the lower half of the body.
Parenchyma. A glandular or other organic structure, formed chiefly of aggregated *cells.*

Parotitis. Inflammation of the parotid gland.

Pathognomonic. Positively distinctive or characteristic of a certain disease.

Pathology. The study of the seat, nature, and essential characters and laws of disease.

Pectoriloquy. Resonance of the voice in the chest, as though produced *immediately under* the ear of the auscultator.

Pellicular. Membranous.

Pemphigus. A bullar eruption upon the skin.

Percepta. Things perceived; impressions upon the senses and brain.

Pericarditis. Inflammation of the pericardium.

Peripheral. Connected with the surface or exterior.

Peritonitis. Inflammation of the peritoneum.

Perturbation. Disturbance, by an exterior or extrinsic cause.

Pertussis. Hooping-cough.

Petechiæ. Small purple spots in or under the skin.

Phlebitis. Inflammation of a vein.

Phlegmasia. An inflammatory disease.

Phlogosis. Inflammation.

Photophobia. Dread of light.

Photopsia. Flashing of light before the eyes.

Phrenitis. Inflammation of the brain.

Phthisis. Wasting. Phthisis pulmonalis, pulmonary consumption.

Pica. Depraved appetite.

Pityriasis. A disease of the skin, accompanied by the exfoliation of minute scales.

Plasma. Organizable fluid; liquor sanguinis.

Plethora. Redundance of red blood.

Pleuritis. Pleurisy; inflammation of the pleura.

Pleurodynia. Neuralgic pain in the region of the pleura.

Pleuro-pneumonia. Inflammation involving both the lung and pleura.

Plexímeter. An instrument for *mediate* percussion; a stroke-measurer.

Plica Polonica. Trichoma; a disease of the hair, rarely met with out of Poland or its vicinity.

Pneumonia. Inflammation of the lung.

Pneumothorax. Accumulation of air in the cavity of the pleura

Podagra. Gout.

Polydipsia. Excessive thirst.
Polysarcia. Obesity.
Pompholyx. A variety of pemphigus.
Porrigo. A parasitic disease of the skin.
Post-organic. Following organization; effete; having been organized, but no longer capable of vitalization.
Præcordial. Over or surrounding the heart.
Premonitory. Warning; threatening.
Prodromata. Forerunning signs or symptoms.
Prognosis. Foreknowledge.
Prophylactic. Preventive.
Prurigo. An affection of the skin, characterized by great itching, with little or no rash.
Pruritus. Itching.
Pseudo-membrane. False membrane; *i.e.* morbid or misplaced coagulation or organization of lymph.
Psora. Itch.
Psoriasis. A scaly disease of the skin.
Psychical. Affecting or relating to the mental or moral nature or faculties.
Ptyalism. Salivation.
Puerperal. Pertaining to child-bed.
Purpura. A hemorrhagic affection of the skin.
Pyæmia. The presence or formation of pus in the blood.
Pyelitis. Inflammation of the pelvis of the kidney.
Pyrexia. Fever.
Pyrosis. Water-brash.

Q

Quininize. To place under the influence of quinine.

R

Rabies canina. Hydrophobia.
Râle. A rattling sound.
Ramule. A small branch.
Rationale. Explanation of a process or occurrence.
Recuperative. Restorative; invigorating.
Reflex. Reflected; occurring under the influence of a *transmitted* excitation, as contrasted with a *direct* stimulus.
Regurgitant. Flowing or escaping backward.

Renal. Belonging to or affecting the kidney.
Remittent. Having remissions; *i.e.* periods of *diminution* of the symptoms (*e.g.* of fever) without their total *subsidence.*
Resorption. Reabsorption.
Résumé. Summary; recapitulation.
Retinitis. Inflammation of the retina.
Revulsion. Derivation.
Rhonchus. A rattling or roaring, or other abnormal sound, connected with respiration.
Roseola. Scarlet rash.
Rubeola. Morbilli; measles.
Rupia. A bullar and scabbing disease of the skin.

S

Saccharine. Of the nature of sugar.
Salivation. Excessive flow of saliva; usually with soreness of the gums, coppery taste, etc.
Sanitary. Pertaining to the preservation of health.
Sarcina. A microscopic vegetation, growing in square or wool-sack-like forms.
Sarcoma. A fleshy tumor.
Scabies. Itch.
Schirrus. Hard cancer.
Sciatica. Neuralgia of the sciatic nerve.
Sclerotitis. Inflammation of the sclerotic coat of the eye.
Scorbutus. Scurvy.
Semeiology. The study of the signs and symptoms of disease.
Sensori-motor. Relating to movements which are connected with sensations.
Sensorium. An aggregate term, including those portions of the brain which are the centres of sensation and perception.
Sentient. Endowed with sensation.
Septic. Putrefactive or decaying.
Serum. The fluid portion of blood after coagulation, or after the removal of its fibrin; also, the liquid transuding upon serous membranes; the liquid of certain dropsical effusions, etc.
Sibilant. Hissing.
Soporific. Promotive of sleep.
Spanæmia. Hydræmia; poverty of blood.
Spermatozoa. Microscopic bodies found in the generative fluid of the male.

Sphacelus. Sloughing.

Spirometry. The measurement of breathing power by the quantity of air exhaled after a forced inspiration.

Sporadic. Separate, independent, occasional; not endemic or epidemic or contagious.

Sputum. Anything ejected by spitting; expectoration.

Squama. A scale.

Stasis. Stagnation; arrest of movement.

Steatomatous. Fatty; consisting principally of fat.

Stercoraceous. Fæcal.

Stertorous. Loud and snoring.

Stethometer. A chest measurer.

Stethoscope. A tube used for mediate auscultation.

Sthenic. Possessed of or attended by vigor and activity.

Stomatitis. Inflammation of the mouth.

Strabismus. Squinting.

Strangury. Dysuria, ischuria.

Subclavian. Under the clavicle.

Subcrepitant. Crackling, but not typically identical with the crepitant râle; being a coarser sound.

Subjective. Originating in the mind, brain, or other part of the individual; as contrasted with *objective, i.e.* of *external* origin.

Subsultus tendinum. Jerking of the tendons; *e.g.* of the wrist in low fever.

Succussion. Sudden shaking.

Sudamina. Minute transparent vesicles, often seen over the breast or abdomen in low fevers.

Sudorific. Promotive of perspiration.

Suggillation. Collection of blood in spots under the skin of the dead body.

Suppuration. The formation of pus.

Sycosis. Mentagra.

Syncope. Fainting; suspended animation.

Synovia. The lubricating fluid of the joints.

Synurgic. Co-operative; working together.

Syphilida, Syphilides. The eruptions occurring under the influence of syphilis.

Systole. The act of contraction of the heart and arteries; usually applied to the contraction of the *ventricles.*

Urina potus. Urine of drink; *i.e.* that passed after a light meal as tea or breakfast.

Urina sanguinis. Urine of the blood; *i.e.* that passed in the morning, after sleep.

Urinometer. An instrument used to estimate the specific gravity of urine; by the distance to which it sinks in the latter, as compared with that to which it will sink in water.

Urticaria. Nettle-rash.

V

Vaccinia. Cow-pox; vaccination.

Varicella. Chicken-pox.

Varicose. Dilated; enlarged.

Variola. Small-pox.

Varioloid. Mild or modified small-pox.

Vascular. Well supplied with blood-vessels.

Venesection. Blood-letting from a vein.

Verruca. A wart.

Vesical. Pertaining to the bladder.

Vesication. The production of a blister.

Vesicle. A small blister.

Vesicular. Composed of, or resembling, vesicles or small cells.

Vibices. Large spots of effused blood under the skin.

Vibrio. A minute animalcule, rarely found in animal tissues or cavities.

Vicarious. Substitutive.

Vitiligo. Partial discoloration of the skin.

Volvulus. Intussusception.

Z

Zona. Shingles; an eruptive disease, affecting only one-half of the body.

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